

AN
HISTORY
OF THE
EARTH,
AND
ANIMATED NATURE.

BY
OLIVER GOLDSMITH.

IN EIGHT VOLUMES.

A NEW EDITION.

VOL. VIII.

LONDON:
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LONDON:
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C O N T E N T S

Of the Eighth Volume.

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AN
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OF
INSECTS.

PART IV.

VOL. VIII.

B



A N
H I S T O R Y
O F
I N S E C T S.

C H A P. I.

Of the Fourth Order of Insects.

IN the foregoing part we treated of caterpillars changing into butterflies; in the present will be given the history of grubs changing into their corresponding winged animals. These, like the former, undergo their transformation, and appear as grubs or maggots, as aurelias, and at last as winged insects. Like the former, they are bred from eggs; they feed in their reptile state; they continue motionless and lifeless, as aurelias; and fly and propagate, when furnished with wings. But they differ in many respects: the grub or maggot wants the number of feet

which the caterpillar is seen to have; the aurelia is not so totally wrapped up, but that its feet and its wings appear. The perfect animal, when emancipated, also has its wings either cased, or transparent like gauze; not coloured with that beautifully painted dust which adorns the wings of the butterfly.

In this class of insects, therefore, we may place a various tribe, that are first laid as eggs, then are excluded as maggots or grubs, then change into aurelias, with their legs and wings not wrapped up, but appearing; and lastly, assuming wings, in which state they propagate their kind. Some of these have four transparent wings, as bees; some have two membranous cases to their wings, as beetles; and some have but two wings, which are transparent, as ants. Here, therefore, we will place the Bee, the Wasp, the Humble Bee, the Ichneumon Fly, the Gnat, the Tipula or Longlegs, the Beetle, the May-Bug, the Glow-Worm, and the Ant. The transformations which all these undergo, are pretty nearly similar; and though very different animals in form, are yet produced nearly in the same manner.



CHAP. II.

Of the Bee.

TO give a complete history of this insect in a few pages, which some have exhausted volumes in describing, and whose nature and properties still continue in dispute, is impossible. It will be sufficient to give a general idea of the animal's operations; which, though they have been studied for more than two thousand years, are still but incompletely known. The account given us by Reaumur is sufficiently minute; and, if true, sufficiently wonderful: but I find many of the facts which he relates, doubted by those who are most conversant with bees; and some of them actually declared not to have a real existence in nature.

It is unhappy, therefore, for those whose method demands an history of bees, that they are unfurnished with those materials which have induced so many observers to contradict so great a naturalist. His life was spent in the contemplation; and it requires an equal share of attention, to prove the error of his discoveries. Without entering, therefore, into the dispute, I will take him for my guide; and just mention, as I go along, those particulars in which succeeding observers have begun to think him

erroneous. Which of the two are right, time only can discover; for my part I have only heard one side, for as yet none have been so bold as openly to oppose Reaumur's delightful researches.

There are three different kinds of bees in every hive. First, the labouring bees, which make up the far greatest number, and are thought to be neither male or female, but merely born for the purposes of labour, and continuing the breed, by supplying the young with provision, while yet in their helpless state. The second sort are the drones; they are of a darker colour, longer, and more thick by one third than the former: they are supposed to be the males; and there is not above a hundred of them in a hive of seven or eight thousand bees. The third sort is much larger than either of the former, and still fewer in number: some assert, that there is not above one in every swarm; but this later observers affirm not to be true, there being sometimes five or six in the same hive. These are called queen-bees, and are said to lay all the eggs from which the whole swarm is hatched in a season.

In examining the structure of the common working bee, the first remarkable part that offers is the trunk, which serves to extract the honey from flowers. It is not formed, like that of other flies, in the manner of a tube, by which
the

the fluid is to be sucked up; but like a besom, to sweep, or a tongue, to lick it away. The animal is furnished also with teeth, which serve it in making wax. This substance is gathered from flowers, like honey; it consists of that dust or farina which contribute to the fecundation of plants, and is moulded into wax by the little animal, at leisure. Every bee, when it leaves the hive to collect this precious store, enters into the cup of the flower, particularly such as seem charged with the greatest quantities of this yellow farina. As the animal's body is covered over with hair, it rolls itself within the flower, and soon becomes quite covered with the dust, which it soon after brushes off with its two hind legs, and kneads into two little balls. In the thighs of the hind legs there are two cavities, edged with hair; and into these, as into a basket, the animal sticks its pellets. Thus employed, the bee flies from flower to flower, encreasing its store, and adding to its stock of wax; until the ball upon each thigh becomes as big as a grain of pepper; by this time, having got a sufficient load, it returns, making the best of its way to the hive.

The belly of the bee is divided into six rings, which sometimes shorten the body, by slipping one over the other. It contains within it, beside the intestines, the honey-bag, the venom-bag,

and the sting. The honey-bag is as transparent as crystal, containing the honey that the bee has brushed from the flowers; of which the greater part is carried to the hive, and poured into the cells of the honey-comb; while the remainder serves for the bee's own nourishment: for during summer it never touches what has been laid up for winter. The sting, which serves to defend this little animal from its enemies, is composed of three parts; the sheath, and two darts, which are extremely small and penetrating. Both the darts have several small points or barbs, like those of a fish-hook, which renders the sting more painful, and makes the darts rankle in the wound. Still, however, this instrument would be very slight, did not the bee poison the wound. The sheath, which has a sharp point, makes the first impression; which is followed by that of the darts, and then the venomous liquor is poured in. The sheath sometimes flicks so fast in the wound, that the animal is obliged to leave it behind; by which the bee soon after dies, and the wound is considerably enflamed. It might at first appear well for mankind, if the bee were without its sting; but upon recollection, it will be found that the little animal would then have too many rivals in sharing its labours. An hundred other lazy animals, fond of honey, and hating labour, would intrude

intrude upon the sweets of the hive; and the treasure would be carried off, for want of armed guardians to protect it.

From examining the bee singly, we now come to consider it in society, as an animal not only subject to laws, but active, vigilant, laborious, and disinterested. All its provisions are laid up for the community; and all its arts in building a cell, designed for the benefit of posterity. The substance with which bees build their cells is wax; which is fashioned into convenient apartments for themselves and their young. When they begin to work in their hives, they divide themselves into four companies: one of which roves in the fields in search of materials; another employs itself in laying out the bottom and partitions of their cells; a third is employed in making the inside smooth from the corners and angles; and the fourth company bring food for the rest, or relieve those who return with their respective burthens. But they are not kept constant to one employment; they often change the tasks assigned them: those that have been at work, being permitted to go abroad; and those that have been in the fields already, take their places. They seem even to have signs by which they understand each other; for when any of them wants food, it bends down its trunk to the bee from whom it is expected, which

then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour is so great, that, in a day's time, they are able to make cells, that lie upon each other, numerous enough to contain three thousand bees.

If we examine their cells, they will be found formed in the exactest proportion. It was said by Pappus, an ancient geometrician, that, of all other figures, hexagons were the most convenient; for, when placed touching each other, the most convenient room would be given, and the smallest lost. The cells of the bees are perfect hexagons: these, in every honeycomb, are double, opening on either side, and closed at the bottom. The bottoms are composed of little triangular panes, which when united together, terminate in a point, and lie exactly upon the extremities of other panes of the same shape, in opposite cells. These lodgings have spaces, like streets, between them, large enough to give the bees a free passage in and out; and yet narrow enough to preserve the necessary heat. The mouth of every cell is defended by a border, which makes the door a little less than the inside of the cell, which serves to strengthen the whole. These cells serve for different purposes: for laying up their young; for their wax,
which

which in winter becomes a part of their food; and for their honey, which makes their principal subsistence.

It is well known that the habitation of bees ought to be very close; and what their hives want, from the negligence or unskilfulness of man, these animals supply by their own industry: so that it is their principal care, when first hived, to stop up all the crannies. For this purpose they make use of a resinous gum, which is more tenacious than wax, and differs greatly from it. This the ancients called Propolis: it will grow considerably hard in June; though it will in some measure soften by heat; and is often found different in consistence, colour, and smell. It has generally an agreeable aromatic odour when it is warmed; and by some it is considered as a most grateful perfume. When the bees begin to work with it, it is soft, but it acquires a firmer consistence every day; till at length it assumes a brown colour, and becomes much harder than wax. The bees carry it on their hinder legs; and some think it is met with on the birch, the willow, and poplar. However it is procured, it is certain that they plaister the inside of their hives with this composition.

If examined through a glass hive, from the hurry the whole swarm is in, the whole at first appears like anarchy and confusion: but the

spectator soon finds every animal diligently employed, and following one pursuit, with a settled purpose. Their teeth are the instruments by which they model and fashion their various buildings, and give them such symmetry and perfection. They begin at the top of the hive; and several of them work at a time, at the cells which have two faces. If they are stinted with regard to time, they give the new cells but half the depth which they ought to have; leaving them imperfect, till they have sketched out the number of cells necessary for the present occasion. The construction of their combs, costs them a great deal of labour: they are made by insensible additions; and not cast at once in a mould, as some are apt to imagine. There seems no end of their shaping, finishing, and turning them neatly up. The cells for their young are most carefully formed; those designed for lodging the drones are larger than the rest; and that for the queen-bee, the largest of all. The cells in which the young brood are lodged, serve at different times for containing honey; and this proceeds from an obvious cause: every worm, before it is transformed into an aurelia, hangs its old skin on the partitions of its cell; and thus, while it strengthens the wall, diminishes the capacity of its late apartment. The same cell, in a single summer, is often tenanted by three or four worms in succession;

cession; and the next season, by three or four more. Each worm takes particular care to fortify the pannels of its cell, by hanging up its spoils there: thus the partitions, being lined six or eight deep, become at last too narrow for a new brood, and are converted into store-houses for honey.

Those cells where nothing but honey is deposited, are much deeper than the rest. When the harvest of honey is so plentiful that they have not sufficient room for it, they either lengthen their combs, or build more; which are much longer than the former. Sometimes they work at three combs at a time; for, when there are three work-houses, more bees may be thus employed, without embarrassing each other.

But honey, as was before observed, is not the only food upon which these animals subsist. The meal of flowers, of which their wax is formed, is one of their most favourite repasts. This is a diet which they live upon during the summer; and of which they lay up a large winter provision. The wax of which their combs are made, is no more than this meal digested, and wrought into a paste. When the flowers upon which bees generally feed are not fully blown, and this meal or dust is not offered in sufficient quantities, the bees pinch the tops of the stamina in which it is contained, with their teeth;

teeth; and thus anticipate the progress of vegetation. In April and May the bees are busy, from morning to evening, in gathering this meal; but when the weather becomes too hot in the midst of summer, they work only in the morning.

The bee is furnished with a stomach for its wax, as well as its honey. In the former of the two, their powder is altered, digested and concocted into real wax; and is thus ejected by the same passage by which it was swallowed. Every comb, newly made, is white: but it becomes yellow as it grows old, and almost black when kept too long in the hive. Beside the wax thus digested, there is a large portion of the powder kneaded up for food in every hive, and kept in separate cells, for winter provision. This is called, by the country people, bee-bread; and contributes to the health and strength of the animal during winter. Those who rear bees, may rob them of their honey, and feed them, during the winter, with treacle; but no proper substitute has yet been found for the bee-bread; and without it, the animals become consumptive and die.

As for the honey, it is extracted from that part of the flower called the nectarium. From the mouth this delicious fluid passes into the gullet; and then into the first stomach, or honey-bag, which, when filled, appears like an oblong bladder.

bladder. Children, that live in country places, are well acquainted with this bladder; and destroy many bees to come at their store of honey. When a bee has sufficiently filled its first stomach, it returns back to the hive, where it disgorges the honey into one of the cells. It often happens that the bee delivers its store to some other, at the mouth of the hive, and flies off for a fresh supply. Some honeycombs are always left open for common use; but many others are stopped up, till there is a necessity of opening them. Each of these is covered carefully with wax, so close, that the covers seem to be made at the very instant the fluid is deposited within them.

Having thus given a cursory description of the insect, individually considered, and of the habitation it forms, we next come to its social habits and institutions; and, in considering this little animal attentively, after the necessary precautions for the immediate preservation of the community, its second care is turned to the continuance of posterity. How numerous soever the multitude of bees may appear in one swarm, yet they all owe their original to a single parent, which is called the queen-bee. It is indeed surprising that a single insect shall, in one summer, give birth to above twenty thousand young; but, upon opening her body, the wonder will cease; as the number of eggs
9 appearing,

appearing, at one time, amounts to five thousand. This animal, whose existence is of such importance to her subjects, may easily be distinguished from the rest, by her size, and the shape of her body. On her safety depends the whole welfare of the commonwealth; and the attentions paid her by all the rest of the swarm, evidently shew the dependence her subjects have upon her security. If this insect be carefully observed, she will be seen at times attended with a numerous retinue, marching from cell to cell, plunging the extremity of her body into many of them, and leaving a small egg in each.

The bees which generally compose her train, are thought to be males, which serve to impregnate her by turns. These are larger and blacker than the common bees; without stings, and without industry. They seem formed only to transmit a posterity; and to attend the queen, whenever she thinks proper to issue from the secret retreats of the hive, where she most usually resides. Upon the union of these two kinds depends all expectations of a future progeny; for the working bees are of no sex, and only labour for another offspring: yet such is their attention to their queen, that if she happens to die, they will leave off working, and take no farther care of posterity. If, however, another queen is in this state of univer-
sal

ful despair presented them, they immediately acknowledge her for sovereign, and once more diligently apply to their labour. It must be observed, however, that all this fertility of the queen-bee, and the great attentions paid to her by the rest, are controverted by more recent observers. They assert, that the common bees are parents themselves; that they deposit their eggs in the cells which they have prepared; that the females are impregnated by the males, and bring forth a progeny, which is wholly their own.

However, to go on with their history, as delivered us by Mr. Reaumur—When the queen-bee has deposited the number of eggs necessary in the cells, the working bees undertake the care of the rising posterity. They are seen to leave off their usual employments; to construct proper receptacles for eggs; or to complete those that are already formed. They purposely build little cells, extremely solid, for the young, in which they employ a great deal of wax: those designed for lodging the males, as was already observed, are larger than the rest; and those for the queen-bees the largest of all. There is usually but one egg deposited in every cell; but when the fecundity of the queen is such, that it exceeds the number of cells already prepared, there are sometimes three or four eggs crowded together in the same apartment. But this.

this is an inconvenience that the working bees will by no means suffer. They seem sensible that two young ones, stuffed up in the same cell, when they grow larger, will but embarrass, and at last destroy each other: they therefore take care to leave a cell to every egg; and remove or destroy the rest.

The single egg that is left remaining, is fixed to the bottom of the cell, and touches it but in a single point. A day or two after it is deposited, the worm is excluded from the shell of the egg, having the appearance of a maggot rolled up in a ring, and lying softly on a bed of a whitish coloured jelly; upon which also the little animal begins to feed. In the mean time, the instant it appears, the working bees attend it with the most anxious and parental tenderness; they furnish it every hour with a supply of this whitish substance, on which it feeds and lies; and watch the cell with unremitting care. They are nurses that have a greater affection for the offspring of others, than many parents have for their own children. They are constant in visiting each cell, and seeing that nothing is wanting; preparing the white mixture, which is nothing but a composition of honey and wax, in their own bowels, with which they feed them. Thus attended, and plentifully fed, the worm, in less than six days time, comes to its full growth, and no longer accepts the food offered it.

it. When the bees perceive that it has no further occasion for feeding, they perform the last offices of tenderness, and shut the little animal up in its cell; walling up the mouth of its apartment with wax: there they leave the worm to itself; having secured it from every external injury.

The worm is no sooner left inclosed, but, from a state of inaction, it begins to labour, extending and shortening its body; and by this means lining the walls of its apartment with a silken tapestry, which it spins in the manner of caterpillars, before they undergo their last transformation. When their cell is thus prepared, the animal is soon after transformed into an aurelia; but differing from that of the common caterpillar, as it exhibits not only the legs, but the wings of the future bee, in its present state of inactivity. Thus, in about twenty or one and twenty days after the egg was laid, the bee is completely formed, and fitted to undergo the fatigues of its state. When all its parts have acquired their proper strength and consistence, the young animal opens its prison, by piercing with its teeth the waxen door that confines it. When just freed from its cell, it is as yet moist, and incommoded with the spoils of its former situation; but the officious bees are soon seen to flock round it, and to lick it clean on all sides with their trunks; while
another

another band, with equal assiduity, are observed to feed it with honey: others again begin immediately to cleanse the cell that has been just left; to carry the ordures out of the hive, and to fit the place for a new inhabitant. The young bee soon repays their care, by its industry; for as soon as ever its external parts become dry, it discovers its natural appetites for labour, and industriously begins the task, which it pursues unremittingly through life. The toil of man is irksome to him, and he earns his subsistence with pain; but this little animal seems happy in its pursuits, and finds delight in all its employments.

When just freed from the cell, and properly equipped by its fellow-bees for duty, it at once issues from the hive, and, instructed only by Nature, goes in quest of flowers, chuses only those that yield it a supply, rejects such as are barren of honey, or have been already drained by other adventurers; and when loaded, is never at a loss to find its way back to the common habitation. After this first sally, it begins to gather the mealy powder that lies on every flower, which is afterwards converted into wax; and with this, the very first day, it returns with two large balls stuck to its thighs.

When bees first begin to break their prisons, there are generally above an hundred excluded in one day. Thus, in the space of a few weeks,
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the number of the inhabitants in one hive, of moderate size, becomes so great, that there is no place to contain the new comers; and they are scarcely excluded from the cell, when they are obliged, by the old bees, to sally forth in quest of new habitations. In other words, the hive begins to swarm, and the new progeny prepares for exile.

While there is room enough in the hive, the bees remain quietly together; it is necessity alone that compels the separation. Sometimes, indeed, the young brood, with graceless obstinacy, refuse to depart, and even venture to resist their progenitors. The young ones are known by being browner than the old, with whiter hair; the old ones are of a lighter colour, with red hair. The two armies are therefore easily distinguishable, and dreadful battles are often seen to ensue. But the victory almost ever terminates with strict poetical justice in favour of the veterans, and the rebellious offspring are driven off, not without loss and mutilation.

In different countries, the swarms make their appearance at different times of the year, and there are several signs previous to this intended migration. The night before, an unusual buzzing is heard in the hive; in the morning, though the weather be soft and inviting, they seem not to obey the call, being

intent on more important meditations within. All labour is discontinued in the hive, every bee is either employed in forcing, or reluctantly yielding a submission; at length, after some noise and tumult, a queen-bee is chosen, to guard, rather than conduct, the young colony to other habitations, and then they are marshalled without any apparent conductor. In less than a minute, they leave their native abode, and forming a cloud round their protectress, they set off, without seeming to know the place of their destination; *The world before them, where to chuse their place of rest.* The usual time of swarming, is from ten in the morning to three in the afternoon, when the sun shines bright, and invites them to seek their fortunes. They flutter for a while, in the air, like flakes of snow, and sometimes undertake a distant journey, but more frequently are contented with some neighbouring asylum; the branch of a tree, a chimney top, or some other exposed situation. It is, indeed, remarkable, that all those animals, of whatever kind, that have long been under the protection of man, seem to lose a part of their natural sagacity, in providing for themselves. The rabbit, when domesticated, forgets to dig holes, the hen to build a nest, and the bee to seek a shelter, that shall protect it from the inclemencies of winter. In those countries, where the bees are wild, and unprotected

ted by man, they are always sure to build their waxen cells in the hollow of a tree; but with us, they seem improvident in their choice, and the first green branch that stops their flight, seems to be thought sufficient for their abode through winter. However, it does not appear that the queen chuses the place where they are to alight, for many of the stragglers, who seem to be pleased with a particular branch, go and settle upon it; others are seen to succeed, and at last, the queen herself, when she finds a sufficient number there before her, goes to make it the place of her head-quarters. When the queen is settled, the rest of the swarm soon follow; and, in about a quarter of an hour, the whole body seem to be at ease. It sometimes is found, that there are two or three queens to a swarm, and the colony is divided into parties; but it most usually happens, that one of these is more considerable than the other, and the bees, by degrees, desert the weakest, to take shelter under the most powerful protector. The deserted queen does not long survive this defeat; she takes refuge under the new monarch, and is soon destroyed by her jealous rival. Till this cruel execution is performed, the bees never go out to work; and if there should be a queen-bee, belonging to the new colony, left in the old hive, she always undergoes the fate of the former. However,

ever, it must be observed, that the bees never sacrifice any of their queens, when the hive is full of wax and honey; for there is at that time no danger in maintaining a plurality of breeders.

When the swarm is thus conducted to a place of rest, and the policy of government is settled, the bees soon resume their former labours. The making cells, storing them with honey, impregnating the queen, making proper cells for the reception of the rising progeny, and protecting them from external danger, employ their unceasing industry. But soon after, and towards the latter end of summer, when the colony is sufficiently stored with inhabitants, a most cruel policy ensues. The drone bees, which are (as has been said) generally in an hive to the number of an hundred, are marked for slaughter. These, which had hitherto led a life of indolence and pleasure, whose only employment was in impregnating the queen, and rioting upon the labours of the hive, without aiding in the general toil, now share the fate of most voluptuaries, and fall a sacrifice to the general resentment of society.

The working bees, in a body, declare war against them; and in two or three days time, the ground all round the hive is covered with their dead bodies. Nay, the working bees will even kill such drones, as are yet in the worm state,

state, in the cell, and eject their bodies from the hive, among the general carnage.

When an hive sends out several swarms in the year, the first is always the best, and the most numerous. These having the whole summer before them, have the more time for making wax and honey, and consequently their labours are the most valuable to the proprietor. Although the swarm chiefly consists of the youngest bees, yet it is often found, that bees of all ages compose the multitude of emigrants, and it often happens, that bees of all ages are seen remaining behind. The number of them is always more considerable than that of some populous cities, for sometimes upwards of forty thousand are found in a single hive. So large a body may well be supposed to work with great expedition; and in fact, in less than twenty-four hours, they will make combs above twenty inches long, and seven or eight broad. Sometimes they will half fill their hives with wax, in less than five days. In the first fifteen days, they are always found to make more wax than they do afterwards during the rest of the year.

Such are the outlines of the natural history of these animals, as usually found in our own country. How they are treated, so as to produce the greatest quantity of honey, belongs rather to the rural œconomist, than the natural

historian; volumes have been written on the subject, and still more remains, equally curious and new. One thing, however, it may be proper to observe, that a farm, or a country, may be over-stocked with bees, as with any other sort of animal; for a certain number of hives always require a certain number of flowers to subsist on. When the flowers near home are rifled, then are these industrious insects seen taking more extensive ranges, but their abilities may be over taxed; and if they are obliged, in quest of honey, to go too far from home, they are over-wearied in the pursuit, they are devoured by birds, or beat down by the winds and rain.

From a knowledge of this, in some parts of France and Piedmont, they have contrived, as I have often seen, a kind of floating bee-house.

They have on board one barge three-score or an hundred bee-hives, well defended from the inclemency of an accidental storm; and with these, the owners suffer themselves to float gently down the river. As the bees are continually chusing their flowery pasture along the banks of the stream, they are furnished with sweets before unrifled; and thus a single floating bee-house yields the proprietor a considerable income. Why a method similiar to this has never been adopted in England, where we
have

have more gentle rivers, and more flowery banks, than in any other part of the world, I know not; certainly it might be turned to advantage, and yield the possessor a secure, though perhaps a moderate income.

Having mentioned the industry of these admirable insects, it will be proper to say something of the effects of their labour, of that wax and honey, which are turned by man to such various uses. Bees gather two kinds of wax, one coarse and the other fine. The coarser sort is bitter, and with this, which is called *propolis*, they stop up all the holes and crevices of their hives. It is of a more resinous nature than the fine wax, and is consequently better qualified to resist the moisture of the season, and preserve the works warm and dry within. The fine wax is as necessary to the animal's preservation as the honey itself. With this they make their lodgings, with this they cover the cells of their young, and in this they lay up their magazines of honey. This is made, as has been already observed, from the dust of flowers, which is carefully kneaded by the little insect, then swallowed, and having undergone a kind of digestion, is formed into the cells, which answer such a variety of purposes. To collect this, the animal rolls itself in the flower it would rob, and thus takes up the vegetable dust with the hair of its body. Then carefully brushing it

into a lump, with its fore paws it thrusts the composition into two cavities behind the thighs, which are made like spoons to receive the wax, and the hair that lines them serves to keep it from falling.

As of wax, there are also two kinds of honey, the white and the yellow. The white is taken without fire from the honey-combs. The yellow is extracted by heat, and squeezed through bags, in a press. The best honey is new, thick, and granulated, of a clear transparent white colour, of a soft and aromatic smell, and of a sweet lively taste. Honey made in mountainous countries is preferable to that of the valley. The honey made in the spring, is more highly esteemed than that gathered in summer, which last is still more valuable than that of autumn, when the flowers begin to fade and lose their fragrance.

The bees are nearly alike in all parts of the world, yet there are differences worthy our notice. In Guadaloupe, the bee is less by one half than the European, and more black and round. They have no sting, and make their cells in hollow trees; where, if the hole they meet with is too large, they form a sort of waxen house, of the shape of a pear, and in this they lodge and store their honey, and lay their eggs. They lay up their honey in waxen vessels, of the size of a pigeon's egg, of a black or
deep

deep violet colour; and these are so joined together, that there is no space left between them. The honey never congeals, but is fluid, of the consistence of oil, and the colour of amber. Resembling these, there are found little black bees, without a sting, in all the tropical climates; and though these countries are replete with bees, like our own, yet those form the most useful and laborious tribe in that part of the world. The honey they produce, is neither so unpalatable, nor so surfeiting as ours; and the wax is so soft, that it is only used for medicinal purposes, it being never found hard enough to form into candles, as in Europe.

Of insects that receive the name of bees, among us there are several; which, however, differ very widely from that industrious social race we have been just describing. The Humble-Bee is the largest of all this tribe, being as large as the first joint of one's middle finger. These are seen in every field, and perched on every flower. They build their nest in holes in the ground, of dry leaves, mixed with wax and wool, defended with moss from the weather. Each humble-bee makes a separate cell, about the size of a small nutmeg, which is round and hollow, containing the honey in a bag. Several of these cells are joined together, in such a manner, that the whole appears like a cluster of grapes. The females, which have the ap-

pearance of wasps, are very few, and their eggs are laid in cells, which the rest soon cover over with wax. It is uncertain whether they have a queen or not; but there is one much larger than the rest, without wings, and without hair, and all over black, like polished ebony. This goes and views all the works, from time to time, and enters into the cell, as if it wanted to see whether every thing was done right: in the morning, the young humble-bees are very idle, and seem not at all inclined to labour, till one of the largest, about seven o'clock, thrusts half its body from a hole, designed for that purpose, and seated on the top of the nest, beats its wings for twenty minutes successively, buzzing the whole time, till the whole colony is put in motion. The humble-bees gather honey, as well as the common bees; but it is neither so fine nor so good, nor the wax so clean, or so capable of fusion.

Besides the bees already mentioned, there are various kinds among us, that have much the appearance of honey-makers, and yet make only wax. The Wood-Bee is seen in every garden. It is rather larger than the common queen-bee; its body of a bluish black, which is smooth and shining. It begins to appear at the approach of spring, and is seen flying near walls exposed to a sunny aspect. This bee makes its
nest

nest in some piece of wood, which it contrives to scoop and hollow for its purpose. This, however, is never done in trees that are standing, for the wood it makes choice of is half rotten. The holes are not made directly forward, but turning to one side, and have an opening sufficient to admit one's middle finger; from whence runs the inner apartment, generally twelve or fifteen inches long. The instruments used in boring these cavities, are their teeth; the cavity is usually branched into three or four apartments; and in each of these they lay their eggs, to the number of ten or twelve, each separate and distinct from the rest. The egg is involved in a sort of paste, which serves at once for the young animal's protection and nourishment. The grown bees, however, feed upon small insects, particularly a louse, of a reddish brown colour, of the size of a small pin's head.

Mason-Bees make their cells with a sort of mortar, made of earth, which they build against a wall that is exposed to the sun. The mortar, which at first is soft, soon becomes as hard as stone, and in this their eggs are laid. Each nest contains seven or eight cells, an egg in every cell, placed regularly one over the other. If the nest remains unhurt, or wants but little repairs, they make use of them the year ensuing: and thus they often serve three or four

years successively. From the strength of their houses, one would think these bees in perfect security, yet none are more exposed than they. A worm with very strong teeth, is often found to bore into their little fortifications, and devour their young.

The Ground-Bee builds its nest in the earth, wherein they make round holes, five or six inches deep; the mouth being narrow, and only just sufficient to admit the little inhabitant. It is amusing enough, to observe the patience and assiduity with which they labour. They carry out all the earth, grain by grain, to the mouth of the hole, where it forms a little hillock, an Alps compared to the power of the artist by which it is raised. Sometimes the walks of a garden are found undermined by their labours; some of the holes running directly downward, others horizontally beneath the surface. They lay up in these cavities provisions for their young, which consist of a paste that has the appearance of corn, and is of a sweetish taste.

The Leaf-cutting Bees make their nest and lay their eggs among bits of leaves, very artificially placed in holes in the earth, of about the length of a tooth pick-case. They make the bits of leaves of a roundish form, and with them line the inside of their habitations. This tapestry is still further lined by a reddish
kind

kind of paste, somewhat sweet or acid. These bees are of various kinds; those that build their nests with chefnut-leaves are as big as drones, but those of the rose-tree are smaller than the common bee.

The Wall-Bees are so called because they make their nests in walls, of a kind of silky membrane with which they fill up the vacuities between the small stones which form the sides of their habitation. Their apartment consists of several cells, placed end to end, each in the shape of a woman's thimble. Though the web which lines this habitation is thick and warm, yet it is transparent and of a whitish colour. This substance is supposed to be spun from the animal's body; the males and females are of a size, but the former are without a sting. To these varieties of the bee kind might be added several others which are all different in nature, but not sufficiently distinguished to excite curiosity.

C H A P. III.

Of the Wasp.

HOWEVER similar many insects may be in appearance, this does not imply a similitude in their history. The bee and the wasp resemble each other very strongly, yet,

in examining their manner and their duration, they differ very widely; the bee labours to lay up honey, and lives to enjoy the fruits of its industry; the wasp appears equally assiduous, but only works for posterity, as the habitation is scarcely completed when the inhabitant dies.

The Wasp is well known to be a winged insect with a sting. To be longer in proportion to its bulk than the bee, to be marked with bright yellow circles round its body, and to be the most swift and active insect of all the fly kind. On each side of the mouth this animal is furnished with a long tooth, notched like a saw, and with these it is enabled to cut any substance, not omitting meat itself, and to carry it to its nest. Wasps live like bees in community, and sometimes ten or twelve thousand are found inhabiting a single nest.

Of all other insects the wasp is the most fierce, voracious, and most dangerous when enraged. They are seen wherever flesh is cutting up, gorging themselves with the spoil, and then flying to their nests with their reeking prey. They make war also on every other fly, and the spider himself dreads their approaches.

Every community among bees is composed of females or queens, drones or males, and neutral or working bees. Wasps have similar occupations;

occupations ; the two first are for propagating the species, the last for nursing, defending and supporting the rising progeny. Among bees, however, there is seldom above a queen or two in an hive ; among wasps there are above two or three hundred.

As soon as the summer begins to invigorate the insect tribes, the wasps are the most of the number, and diligently employed either in providing provisions for their nest, if already made, or in making one, if the former habitation be too small to receive the encreasing community. The nest is one of the most curious objects in natural history, and contrived almost as artificially as that of the bees themselves. Their principal care is to seek out an hole that has been begun by some other animal, a field mouse, a rat, or a mole, to build their nests in. They sometimes build upon the plain, where they are sure of the dryness of their situation, but most commonly on the side of a bank, to avoid the rain or water that would otherwise annoy them. When they have chosen a proper place they go to work with wonderful assiduity. Their first labour is to enlarge and widen the hole, taking away the earth and carrying it off to some distance. They are perfectly formed for labour, being furnished with a trunk above their mouths, two saws on each side, which play to the right and

left against each other, and six strong muscular legs to support them. They cut the earth into small parcels with their saws, and carry it out with their legs or paws. This is the work of some days; and at length the outline of their habitation is formed, making a cavity of about a foot and an half every way. While some are working in this manner, others are roving the fields to seek out materials for their building. To prevent the earth from falling down and crushing their rising city into ruin, they make a sort of roof with their gluey substance, to which they begin to fix the rudiments of their building, working from the top downwards, as if they were hanging a bell, which, however, at length they close up at the bottom. The materials with which they build their nests, are bits of wood and glue. The wood they get where they can from the rails and posts which they meet with in the fields and elsewhere. These they saw and divide into a multitude of small fibres, of which they take up little bundles in their claws, letting fall upon them a few drops of gluey matter with which their bodies are provided, by the help of which they knead the whole composition into a paste, which serves them in their future building. When they have returned with this to the nest, they stick their load of paste on that part where they make their walls and partitions;

titions; they tread it close with their feet, and trowel it with their trunks, still going backwards as they work. Having repeated this operation three or four times, the composition is at length flatted out until it becomes a small leaf of a grey colour, much finer than paper, and of a pretty firm texture. This done the same wasp returns to the field to collect a second load of paste, repeating the same several times, placing layer upon layer, and strengthening every partition in proportion to the wants or convenience of the general fabric. Other working wasps come quickly after to repeat the same operation, laying more leaves upon the former, till at length, after much toil, they have finished the large roof which is to secure them from the tumbling in of the earth. This dome being finished, they make another entrance to their habitation, designed either for letting in the warmth of the sun, or for escaping in case one door be invaded by plunderers. Certain however it is, that by one of these they always enter, by the other they sally forth to their toil; each hole being so small that they can pass but one at a time. The walls being thus composed, and the whole somewhat of the shape of a pear, they labour at their cells, which they compose of the same paper-like substance that goes to the formation of the outside works. Their combs differ from those of bees, not less

less in the composition than the position which they are always seen to obtain. The honeycomb of the bee is edgeways with respect to the hive; that of the wasp is flat, and the mouth of every cell opens downwards. Thus is their habitation contrived, story above story, supported by several rows of pillars which give firmness to the whole building, while the upper story is flat-roofed, and as smooth as the pavement of a room, laid with squares of marble. The wasps can freely walk upon these stories between the pillars, to do whatever their wants require. The pillars are very hard and compact, being larger at each end than in the middle, not much unlike the columns of a building. All the cells of the nest are only destined for the reception of the young, being replete with neither wax nor honey.

Each cell is like that of the bee, hexagonal; but they are of two sorts, the one larger for the production of the male and female wasps, the other less for the reception of the working part of the community. When the females are impregnated by the males, they lay their eggs, one in each cell, and stick it in with a kind of gummy matter to prevent its falling out. From this egg proceeds the insect in its worm-state, of which the old ones are extremely careful, feeding it from time to time till it becomes large, and entirely fills up its cell. But
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the wasp community differs from that of the bee in this, that among the latter the working bees take the parental duties upon them, whereas among the wasps the females alone are permitted to feed their young, and to nurse their rising progeny. For this purpose the female waits with great patience till the working wasps have brought in their provisions, which she takes from them, and cuts into pieces. She then goes with great composure from cell to cell, and feeds every young one with her mouth. When the young worms have come to a certain size they leave off eating, and begin to spin a very fine silk, fixing the first end to the entrance of the cell, then turning their heads, first on one side, then on the other, they fix the thread to different parts, and thus they make a sort of a door which serves to close up the mouth of the cell. After this they divest themselves of their skins after the usual mode of transformation, the aurelia by degrees begins to emancipate itself from its shell: by little and little it thrusts out its legs and wings, and insensibly acquires the colour and shape of its parent.

The wasp thus formed, and prepared for depredation, becomes a bold, troublesome, and dangerous insect: there are no dangers which it will not encounter in pursuit of its prey, and nothing seems to satiate its gluttony. Though
it

it can gather no honey of its own, no animal is more fond of sweets. For this purpose it will pursue the bee and the humble-bee, destroy them with its sting, and then plunder them of their honey-bag, with which it flies triumphantly loaded to its nest to regale its young. Wasps are ever fond of making their nests in the neighbourhood of bees, merely to have an opportunity of robbing their hives, and feasting on the spoil. Yet the bees are not found always patiently submissive to their tyranny, but fierce battles are sometimes seen to ensue, in which the bees make up by conduct and numbers what they want in personal prowess. When there is no honey to be had, they seek for the best and sweetest fruits, and they are never mistaken in their choice. From the garden they fly to the city, to the grocers shops, and butchers shambles. They will sometimes carry off bits of flesh half as big as themselves, with which they fly to their nest for the nourishment of their brood. Those who cannot drive them away, lay for them a piece of ox's liver, which being without fibres, they prefer to other flesh; and whenever they are found, all other flies are seen to desert the place immediately. Such is the dread with which these little animals impress all the rest of the insect tribes, which they seize and devour without mercy, that they vanish at their approach.

approach. Wherever they fly, like the eagle or the falcon, they form a desert in the air around them. In this manner the summer is passed in plundering the neighbourhood, and rearing up their young; every day adds to their numbers; and from their strength, agility, and indiscriminate appetite for every kind of provision, were they as long-lived as the bee, they would soon swarm upon the face of nature, and become the most noxious plague of man: but providentially their lives are measured to their mischief, and they live but a single season.

While the summer heats continue, they are bold, voracious, and enterprising: but as the sun withdraws, it seems to rob them of their courage and activity. In proportion as the cold increases, they are seen to become more domestic; they seldom leave the nest, they make but short adventures from home, they flutter about in the noon-day heats, and soon after return chilled and feeble.

As their calamities increase, new passions soon begin to take place; the care for posterity no longer continues, and as the parents are no longer able to provide their growing progeny a supply, they take the barbarous resolution of sacrificing them all to the necessity of the times. In this manner, like a garrison upon short allowance, all the useless hands are destroyed; the
young

young worms, which a little before they fed and protected with so much assiduity, are now butchered and dragged from their cells. As the cold increases, they no longer find sufficient warmth in their nests, which grow hateful to them, and they fly to seek it in the corners of houses, and places that receive an artificial heat. But the winter is still insupportable; and, before the new year begins, they wither and die; the working wasps first, the males soon following, and many of the females suffering in the general calamity. In every nest, however, one or two females survive the winter, and having been impregnated by the male during the preceding season, she begins in spring to lay her eggs in a little hole of her own contrivance. This bundle of eggs, which is clustered together like grapes, soon produces two worms, which the female takes proper precaution to defend and supply, and these when hatched soon give assistance to the female, who is employed in hatching two more; these also gathering strength, extricate themselves out of the web that inclosed them, and become likewise assistants to their mother; fifteen days after, two more make their appearance; thus is the community every day increasing, while the female lays in every cell, first a male and then a female. These soon after become breeders in turn, till, from a single female, ten thousand wasps are seen produced before

before the month of June. After the female has thus produced her progeny, which are distributed in different districts, they assemble from all parts, in the middle of summer, and provide for themselves the large and commodious habitation which has been described above.

Such is the history of the social wasp; but, as among bees, so also among these insects, there are various tribes that live in solitude: these lay their eggs in an hole for the purpose, and the parent dies long before the birth of its offspring. In the principal species of the Solitary Wasps, the insect is smaller than the working wasp of the social kind. The filament, by which the corselet is joined to the body, is longer and more distinctly seen, and the whole colour of the insect is blacker than in the ordinary kinds. But it is not their figure, but the manners of this extraordinary insect that claim our principal regard.

From the end of May to the beginning of July, this wasp is seen most diligently employed. The whole purpose of its life seems to be in contriving and fitting up a commodious apartment for its young one, which is not to succeed it till the year ensuing. For this end it is employed, with unwearied assiduity, in boring an hole into the finest earth some inches deep, but not much wider than the diameter of its own body.

body. This is but a gallery leading to a wider apartment destined for the convenient lodgment of its young. As it always chuses a gravelly soil to work in, and where the earth is almost as hard as stone itself, the digging and hollowing this apartment is an enterprize of no small labour; for effecting its operations, this insect is furnished with two teeth, which are strong and firm, but not sufficiently hard to penetrate the substance through which it is resolved to make its way: in order therefore to soften that earth which it is unable to pierce, it is furnished with a gummy liquor which it emits upon the place, and which renders it more easily separable from the rest, and the whole becoming a kind of soft paste, is removed to the mouth of the habitation. The animal's provision of liquor in these operations is however soon exhausted; and it is then seen either taking up water from some neighbouring flower or stream in order to supply the deficiency.

At length, after much toil, a hole some inches deep is formed, at the bottom of which is a large cavity; and to this no other hostile insect would venture to find its way, from the length and the narrowness of the defile through which it would be obliged to pass. In this the solitary wasp lays its egg, which is destined to continue the species; there the nascent animal is to continue
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for above nine months, unattended and immured, and at first appearance the most helpless insect of the creation. But when we come to examine, new wonders offer, no other insect can boast so copiously luxurious a provision, or such confirmed security.

As soon as the mother-wasp has deposited her egg at the bottom of the hole, her next care is to furnish it with a supply of provisions, which may be offered to the young insect as soon as it leaves the egg. To this end she procures a number of little green worms, generally from eight to twelve, and these are to serve as food for the young one the instant it awakens into life. When this supply is regularly arranged and laid in, the old one then, with as much assiduity as it before worked out its hole, now closes the mouth of the passage; and thus leaving its young one immured in perfect security, and in a copious supply of animal food, she dies, satisfied with having provided for a future progeny.

When the young one leaves the egg it is scarcely visible, and is seen immured among a number of insects, infinitely larger than itself, ranged in proper order around it, which, however, give it no manner of apprehension. Whether the parent, when she laid in the insect provision, contrived to disable the worms from resistance, or whether they were at first incapable

pable of any, is not known. Certain it is, that the young glutton feasts upon the living spoil without any controul; his game lies at his hand, and he devours one after the other as the calls of appetite incite him. The life of the young animal is therefore spent in the most luxurious manner, till its whole stock of worms is exhausted, and then the time of its transformation begins to approach; and then spinning a filken web, it continues fixed in its cell till the sun calls it from its dark abode the ensuing summer.

The wasps of Europe are very mischievous, yet they are innocence itself when compared to those of the tropical climates, where all the insect tribes are not only numerous, but large, voracious, and formidable. Those of the West Indies are thicker, and twice as long as the common bee; they are of a grey colour, striped with yellow, and armed with a very dangerous sting. They make their cells in the manner of an honeycomb, in which the young ones are hatched and bred. They generally hang their nests by threads, composed of the same substance with the cells, to the branches of trees, and the eaves of houses. They are seen every where in great abundance, descending like fruit, particularly pears, of which shape they are, and as large as one's head. The inside is divided into three round stories, full of cells, each hexagonal,

like those of an honeycomb. In some of the islands, these insects are so very numerous, that their nests are stuck up in this manner, scarce two feet asunder, and the inhabitants are in continual apprehension from their accidental resentment. It sometimes happens, that no precautions can prevent their attacks, and the pain of their sting is almost insupportable. Those who have felt it think it more terrible than even that of a scorpion; the whole visage swells, and the features are so disfigured, that a person is scarcely known by his most intimate acquaintance.

C H A P. IV.

Of the Ichneumon Fly.

EVERY rank of insects, how voracious soever, have enemies that are terrible to them, and that revenge upon them the injuries done upon the rest of the animated creation. The wasp, as we have seen, is very troublesome to man, and very formidable to the insect tribe; but the ichneumon fly (of which there are many varieties) fears not the wasp itself; it enters its retreats, plunders its habitations, and takes possession of that cell for its own young, which the wasp had laboriously built for a dearer posterity.

Though

Though there are many different kinds of this insect, yet the most formidable, and that best known, is called the Common Ichneumon, with four wings, like the bee, a long slender black body, and a three-forked tail, consisting of bristles; the two outermost black, and the middlemost red. This fly receives its name from the little quadrupede, which is found to be so destructive to the crocodile, as it bears a strong similitude in its courage and rapacity.

Though this instrument is, to all appearance, slender and feeble, yet it is found to be a weapon of great force and efficacy. There is scarce any substance which it will not pierce; and, indeed, it is seldom seen but employed in penetration. This is the weapon of defence, this is employed in destroying its prey; and still more, by this the animal deposits her eggs wherever she thinks fit to lay them. As it is an instrument chiefly employed for this purpose, the male is unprovided with such a sting, while the female uses it with great force and dexterity, brandishing it when caught, from side to side, and very often wounding those who thought they held her with the greatest security.

All the flies of this tribe are produced in the same manner, and owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity.

turity. There is no insect whatever, which they will not attack, in order to leave their fatal present in its body; the caterpillar, the gnat, and even the spider himself, so formidable to others, is often made the unwilling fosterer of this destructive progeny.

About the middle of summer, when other insects are found in great abundance, the ichneumon is seen flying busily about, and seeking proper objects upon whom to depose its progeny. As there are various kinds of this fly, so they seem to have various appetites. Some are found to place their eggs within the aurelia of some nascent insect, others place them within the nest, which the wasp had curiously contrived for its own young; and as both are produced at the same time, the young of the ichneumon not only devours the young wasp, but the whole supply of worms, which the parent had carefully provided for its provision. But the greatest number of the ichneumon tribe are seen settling upon the back of the caterpillar, and darting, at different intervals, their stings into its body. At every dart they deposit an egg, while the wounded animal seems scarcely sensible of the injury it sustains. In this manner they leave from six to a dozen of their eggs within the fatty substance of the reptile's body, and then fly off to commit farther depredations. In the mean time the caterpillar thus irreparably in-

jured, seems to feed as voraciously as before; does not abate of its usual activity; and, to all appearance, seems no way affected by the internal enemies that are preparing its destruction in their darksome abode. But they soon burst from their egg state, and begin to prey upon the substance of their prison. As they grow larger, they require a greater supply, till at last the animal, by whose vitals they are supported, is no longer able to sustain them, but dies; its whole inside being almost eaten away. It often happens, however, that it survives their worm state, and then they change into a chrysalis, enclosed in the caterpillar's body till the time of their delivery approaches, when they burst their prisons, and fly away. The caterpillar, however, is irreparably destroyed, it never changes into a chrysalis, but dies shortly after, from the injuries it had sustained.

Such is the history of this fly, which, though very terrible to the insect tribe, fails not to be of infinite service to mankind. The millions which it kills in a single summer, are inconceivable; and without such a destroyer the fruits of the earth would only rise to furnish a banquet for the insect race, to the exclusion of all the nobler ranks of animated nature.

C H A P. V.

Of the Ant.

THOUGH the number of two-winged flies be very great, and the naturalists have taken some pains to describe their characters and varieties; yet there is such a similitude in their forms and manners, that in a work like this, one description must serve for all. We now, therefore, come to a species of four-winged insects, that are famous from all antiquity, for their social and industrious habits, that are marked for their spirit of subordination, that are offered as a pattern of parsimony to the profuse, and of unremitting diligence to the sluggard.

In the experiments, however, which have been more recently made, and the observations which have been taken, much of their boasted frugality and precaution seems denied them; the treasures they lay up, are no longer supposed intended for future provision; and the choice they make in their stores, seems no way dictated by wisdom. It is, indeed, somewhat surprising, that almost every writer of antiquity should describe this insect, as labouring in the summer, and feasting upon the produce during

the winter. — Perhaps, in some of the warmer climates, where the winter is mild, and of short continuance, this may take place; but in France and England these animals can have no manner of occasion for a supply of winter provisions, as they are actually in a state of torpidity during that season.

The Common Ants of Europe are of two or three different kinds; some red, some black, some with stings, and others without. Such as have stings, inflict their wounds in that manner; such as are unprovided with these weapons of defence, have a power of spurting, from their hinder parts, an acid pungent liquor, which, if it lights upon the skin, inflames and burns it like nettles.

The body of an ant is divided into the head, breast, and belly. In the head, the eyes are placed, which are entirely black, and under the eyes there are two small horns or feelers, composed of twelve joints, all covered with a fine silky hair. The mouth is furnished with two crooked jaws, which project outwards, in each of which are seen incisures, that look like teeth. The breast is covered with a fine silky hair, from which project six legs, that are pretty strong and hairy, the extremities of each armed with two small claws, which the animal uses in climbing. The belly is more reddish than the
rest

rest of the body, which is of a brown chesnut colour, shining as glass, and covered with extremely fine hair.

From such a formation, this animal seems bolder, and more active, for its size, than any other of the insect tribe, and fears not to attack a creature, often above ten times its own magnitude.

As soon as the winter is past, in the first fine day in April, the ant-hill, that before seemed a desert, now swarms with new life, and myriads of these insects are seen just awaked from their annual lethargy, and preparing for the pleasures and fatigues of the season. For the first day they never offer to leave the hill, which may be considered as their citadel, but run over every part of it, as if to examine its present situation, to observe what injuries it has sustained during the rigours of winter*, while they slept, and to meditate and settle the labours of the day ensuing.

At the first display of their forces, none but the wingless tribe appears, while those furnished with wings remain at the bottom. These are the working ants, that first appear, and that are always destitute of wings; the males and females, that are furnished with four large

* Memoires pour servir à l'Histoire des Insectes, par Charles de Geer.

wings each, are more slow in making their appearance.

Thus, like bees, they are divided into males, females, and the neutral or the working tribe. These are all easily distinguished from each other; the females are much larger than the males; the working ants are the smallest of all. The two former have wings; which, however, they sometimes are divested of; the latter never have any, and upon them are devolved all the labours that tend to the welfare of the community. The female also may be distinguished by the colour and structure of her breast, which is a little more brown than that of the common ant, and a little brighter than that of the male.

In eight or ten days after their first appearance, the labours of the hill are in some forwardness; the males and females are seen mixed with the working multitude, and pursued or pursuing each other. They seem no way to partake in the common drudgeries of the state; the males pursue the females with great assiduity, and in a manner force them to compliance. They remain coupled for some time, while the males thus united suffer themselves to be drawn along by the will of their partners.

In the mean time, the working body of the state take no part in their pleasures; they are
seen

seen diligently going from the ant-hill, in pursuit of food for themselves and their associates, and of proper materials for giving a comfortable retreat to their young, or safety to their habitation. In the fields of England, ant-hills are formed with but little apparent regularity. In the more southern provinces of Europe, they are constructed with wonderful contrivance, and offer a sight highly worthy a naturalist's curiosity. These are generally formed in the neighbourhood of some large tree and a stream of water. The one is considered by the animals, as the proper place for getting food; the other for supplying them with moisture, which they cannot well dispense with. The shape of the ant-hill is that of a sugar-loaf, about three feet high, composed of various substances, leaves, bits of wood, sand, earth, bits of gum, and grains of corn. These are all united into a compact body, perforated with galleries down to the bottom, and winding ways within the body of the structure. From this retreat to the water, as well as to the tree, in different directions, there are many paths worn by constant assiduity, and along these the busy insects are seen passing and repassing continually; so that from May, or the beginning of June, according to the state of the season, they work continually, till the bad weather comes on.

The chief employment of the working ants,

is in sustaining not only the idlers at home, but also finding a sufficiency of food for themselves. They live upon various provisions, as well of the vegetable as of the animal kind. Small insects they will kill and devour; sweets of all kinds they are particularly fond of. They seldom, however, think of their community, till they themselves are first satiated. Having found a juicy fruit, they swallow what they can, and then tearing it in pieces, carry home their load. If they meet with an insect above their match, several of them will fall upon it at once, and having mangled it, each will carry off a part of the spoil. If they meet, in their excursions, any thing that is too heavy for one to bear, and yet, which they are unable to divide, several of them will endeavour to force it along; some dragging and others pushing. If any one of them happens to make a lucky discovery, it will immediately give advice to others; and then at once, the whole republic will put themselves in motion. If in these struggles, one of them happens to be killed, some kind survivor will carry him off to a great distance, to prevent the obstructions his body may give to the general spirit of industry.

But while they are thus employed in supporting the state, in feeding abroad, and carrying in provisions to those that continue at home, they are not unmindful of posterity. After a
few

few days of fine weather, the female ants begin to lay their eggs, and those are as assiduously watched and protected by the working ants, who take upon themselves to supply whatever is wanting to the nascent animal's convenience or necessity. They are carried, as soon as laid, to the safest situation, at the bottom of their hill, where they are carefully defended from cold and moisture. We are not to suppose, that those white substances which we so plentifully find in every ant-hill, are the eggs as newly laid. On the contrary, the ant's egg is so very small, that, though laid upon a black ground, it can scarcely be discerned. The little white bodies we see, are the young animals in their maggot state, endued with life, long since freed from the egg, and often involved in a cone, which it has spun round itself, like the silkworm. The real egg, when laid, if viewed through a microscope, appears smooth, polished and shining, while the maggot is seen composed of twelve rings, and is oftener larger than the ant itself.

It is impossible to express the fond attachment which the working ants shew to their rising progeny. In cold weather they take them in their mouths, but without offering them the smallest injury, to the very depths of their habitation, where they are less subject to the severity of the season. In a fine day they remove

them, with the same care, nearer the surface, where their maturity may be assisted by the warm beams of the sun. If a formidable enemy should come to batter down their whole habitation, and crush them by thousands in the ruin, yet these wonderful insects, still mindful of their parental duties, make it their first care to save their offspring. They are seen running wildly about, and different ways, each loaded with a young one, often bigger than the insect that supports it. I have kept, says Swammerdam, several of the working ants in my closet, with their young, in a glass filled with earth. I took pleasure in observing, that in proportion as the earth dried on the surface, they dug deeper and deeper to deposit their eggs; and when I poured water thereon, it was surprising to see with what care, affection, and diligence they laboured, to put their brood in safety, in the driest place. I have seen also, that when water has been wanting for several days, and when the earth was moistened after it a little, they immediately carried their young ones to have a share, who seemed to enjoy and suck the moisture.

When the young maggot is come to its full growth, the breast swells insensibly, it casts its skin, and loses all motion. All the members which were hidden before, then begin to appear, an aurelia is formed, which represents very distinctly

distinctly all the parts of the animal, though they are yet without motion, and as it were wrapped up in swaddling-cloaths. When at length, the little insect has passed through all its changes, and acquired its proper maturity, it bursts this last skin, to assume the form it is to retain ever after. Yet this is not done by the efforts of the little animal alone, for the old ones very assiduously break open, with their teeth, the covering in which it is enclosed. Without this assistance the aurelia would never be able to get free, as M. de Geer often found, who tried the experiment, by leaving the aurelia to themselves. The old ones not only assist them, but know the very precise time for lending their assistance; for, if produced too soon, the young one dies of cold; if retarded too long, it is suffocated in its prison.

When the female has done laying, and the whole brood is thus produced, her labours, as well as that of the male, become unnecessary; and her wings, which she had but a short time before so actively employed, drop off. What becomes of her when thus divested of her ornaments is not well known, for she is seen in the cells for some weeks after. The males, on the other hand, having no longer any occupation at home, make use of those wings with which they have been furnished by nature, and fly away, never to return, or to be heard of more. It is

probable they perish with the cold, or are devoured by the birds, which are particularly fond of this petty prey.

In the mean time, the working ants having probably deposed their queens, and being deserted by the males, that served but to clog the community, prepare for the severity of the winter, and bury their retreats as deep in the earth as they conveniently can. It is now found that the grains of corn, and other substances with which they furnish their hill, are only meant as fences to keep off the rigours of the weather, not as provisions to support them during its continuance. It is found generally to obtain, that every insect that lives a year after it is come to its full growth, is obliged to pass four or five months without taking any nourishment, and will seem to be dead all that time. It would be to no purpose, therefore, for ants to lay up corn for the winter, since they lie that time without motion, heaped upon each other, and are so far from eating, that they are utterly unable to stir. Thus what authors have dignified by the name of a magazine, appears to be no more than a cavity, which serves for a common retreat when the weather forces them to return to their lethargic state.

What has been said with exaggeration of the European ant, is however true, if asserted of those of the tropical climates. They build an
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ant-hill with great contrivance and regularity, they lay up provisions, and, as they probably live the whole year, they submit themselves to regulations entirely unknown among the ants of Europe.

Those of Africa are of three kinds, the red, the green, and the black; the latter are above an inch long, and in every respect a most formidable insect. Their sting produces extreme pain, and their depredations are sometimes extremely destructive. They build an ant-hill of a very great size, from six to twelve feet high; it is made of viscous clay, and tapers into a pyramidal form. This habitation is constructed with great artifice; and the cells are so numerous and even, that an honeycomb scarce exceeds them in number and regularity.

The inhabitants of this edifice seem to be under a very strict regulation. At the slightest warning they will fall out upon whatever disturbs them; and if they have time to arrest their enemy, he is sure to find no mercy. Sheep, hens, and even rats are often destroyed by these merciless insects, and their flesh devoured to the bone. No anatomist in the world can strip a skeleton so cleanly as they; and no animal, how strong soever, when they have once seized upon it, has power to resist them.

It often happens that these insects quit their
retreat

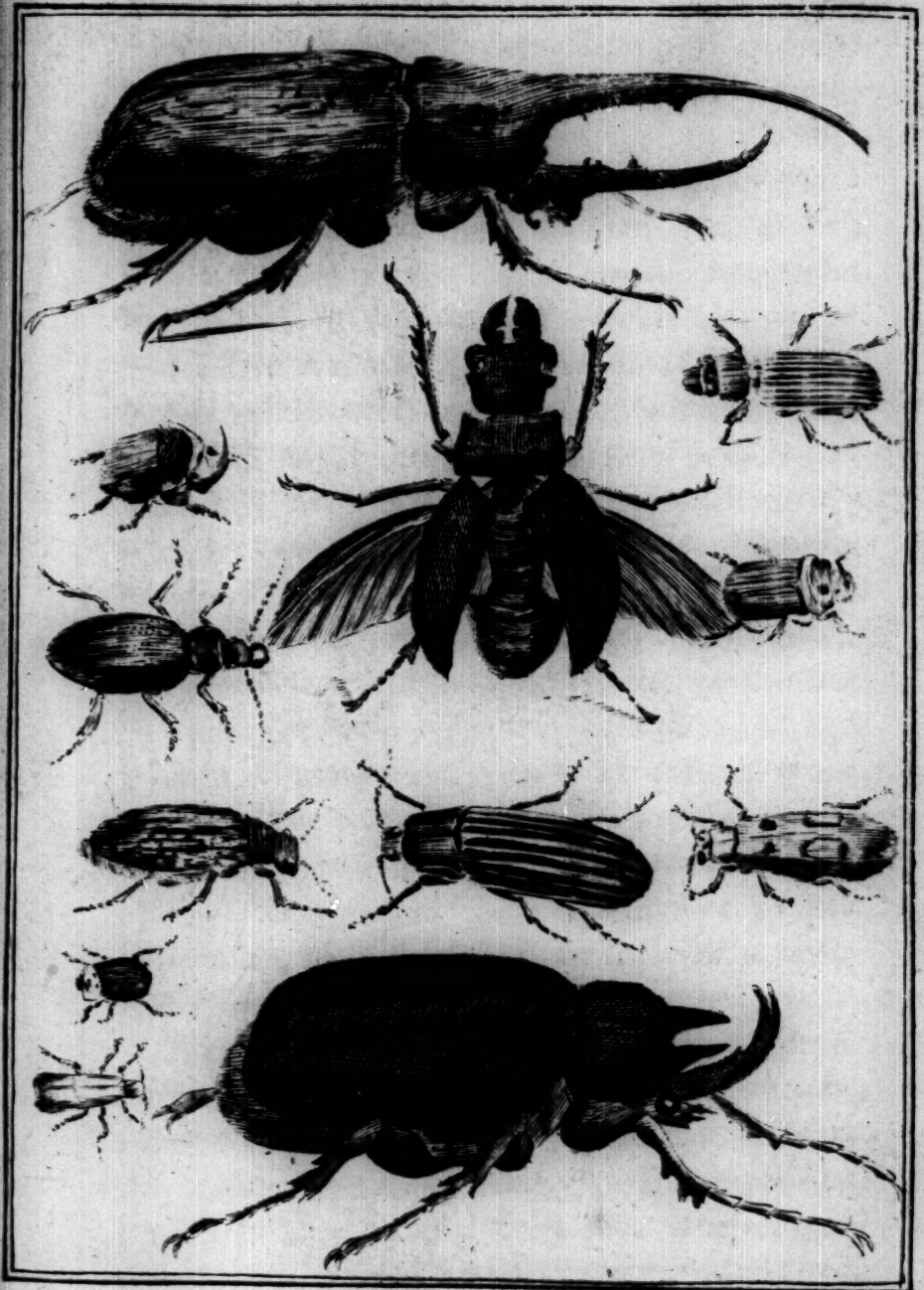
retreat in a body, and go in quest of adventures.
“ During my stay,” says Smith, “ at Cape
“ Corse Castle, a body of these ants came to
“ pay us a visit in our fortification. It was
“ about day-break when the advanced guard
“ of this famished crew entered the chapel,
“ where some negroe servants were asleep upon
“ the floor. The men were quickly alarmed at
“ the invasion of this unexpected army, and
“ prepared, as well as they could, for a defence.
“ While the foremost battalion of insects had
“ already taken possession of the place, the rear-
“ guard was more than a quarter of a mile
“ distant. The whole ground seemed alive,
“ and crawling with unceasing destruction.
“ After deliberating a few moments upon what
“ was to be done, it was resolved to lay a large
“ train of gunpowder along the path they had
“ taken: by this means millions were blown
“ to pieces, and the rear-guard perceiving the
“ destruction of their leaders, thought proper
“ instantly to return, and make back to their
“ original habitation.”

The order which these ants observe, seems
very extraordinary; whenever they fall forth,
fifty or sixty larger than the rest are seen to head
the band, and conduct them to their destined
prey. If they have a fixed spot where their
prey continues to resort, they then form a vaulted
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Beetles.

C. Martin sculp.

gallery, which is sometimes a quarter of a mile in length; and yet they will hollow it out in the space of ten or twelve hours.

C H A P. VI.

Of the Beetle, and its Varieties.

HITHERTO we have been treating of insects with four transparent wings, we now come to a tribe with two transparent wings, with cases that cover them close while at rest, but which allow them their proper play when flying. The principal of these are the Beetle, the May-Bug, and the Cantharis. These are all bred like the rest of their order, first from eggs, then they become grubs, then a chrysalis in which the parts of the future fly are distinctly seen, and lastly the animal leaves its prison, breaking forth as a winged animal in full maturity.

Of the Beetle there are various kinds; all, however, concurring in one common formation of having cases to their wings, which are the more necessary to those insects, as they often live under the surface of the earth, in holes which they dig out by their own industry. These cases prevent the various injuries their real wings might sustain, by rubbing or crushing against the sides of their abode. These, though

though they do not assist flight, yet keep the internal wings clean and even, and produce a loud buzzing noise, when the animal rises in the air.

If we examine the formation of all animals of the beetle kind, we shall find, as in shell-fish, that their bones are placed externally, and their muscles within. These muscles are formed very much like those of quadrupedes, and are endowed with such surprising strength, that bulk for bulk, they are a thousand times stronger than those of a man. The strength of these muscles is of use in digging the animal's subterraneous abode, where it is most usually hatched, and to which it most frequently returns, even after it becomes a winged insect, capable of flying.

Beside the difference which results from the shape and colour of these animals, the size also makes a considerable one; some beetles being not larger than the head of a pin, while others, such as the elephant-beetle, are as big as one's fist. But the greatest difference among them is, that some are produced in a month, and in a single season go through all the stages of their existence, while others take near four years to their production; and live as winged insects a year more. To give the history of all these animals, that are bred pretty much in the same way, would be insipid and endless; it will suffice
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to select one or two from the number, the origin of which may serve as specimens of the rest. I will, therefore, offer the history of the May-bug to the reader's attention; premising, that most other beetles, though not so long lived, are bred in the same manner.

The May-bug, or dorr-beetle, as some call it, has, like all the rest, a pair of cases to its wings, which are of a reddish brown colour, sprinkled with a whitish dust, which easily comes off. In some years their necks are seen covered with a red plate, and in others, with a black; these, however, are distinct sorts, and their difference is by no means accidental. The fore legs are very short, and the better calculated for burrowing in the ground, where this insect makes its retreat. It is well known for its evening buzz to children; but still more formidably introduced to the acquaintance of husbandmen and gardeners, for in some seasons it has been found to swarm in such numbers, as to eat up every vegetable production.

The two sexes in the May-bug are easily distinguished from each other, by the superior length of the tufts, at the end of the horns, in the male. They begin to copulate in summer, and at that season they are seen joined together for a considerable time. The female being impregnated, quickly falls to boring an hole into the ground, where to deposit her burthen. This
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is generally about half a foot deep, and in it she places her eggs, which are of an oblong shape, with great regularity, one by the other. They are of a bright yellow colour, and no way wrapped up in a common covering, as some have imagined. When the female is lightened of her burthen, she again ascends from her hole, to live as before, upon leaves and vegetables, to buzz in the summer evening, and to lie hid, among the branches of trees, in the heat of the day.

In about three months after these eggs have been thus deposited in the earth, the contained insect begins to break its shell, and a small grub or maggot crawls forth, and feeds upon the roots of whatever vegetable it happens to be nearest. All substances, of this kind, seem equally grateful, yet it is probable the mother insect has a choice among what kind of vegetables she shall deposit her young. In this manner these voracious creatures continue in the worm state, for more than three years, devouring the roots of every plant they approach, and making their way under ground, in quest of food, with great dispatch and facility. At length they grow to above the size of a walnut, being a great thick white maggot with a red head, which is seen most frequently in new-turned earth, and which is so eagerly sought after by birds of every species. When largest,

largest, they are found an inch and an half long, of a whitish yellow colour, with a body consisting of twelve segments or joints, on each side of which there are nine breathing holes, and three red feet. The head is large, in proportion to the body, of a reddish colour, with a pincer before, and a semi-circular lip, with which it cuts the roots of plants, and sucks out their moisture. As this insect lives entirely under ground, it has no occasion for eyes, and accordingly it is found to have none; but is furnished with two feelers, which, like the crutch of a blind man, serve to direct its motions. Such is the form of this animal, that lives for years in the worm state under ground, still voracious, and every year changing its skin.

It is not till the end of the fourth year, that this extraordinary insect prepares to emerge from its subterraneous abode, and even this is not effected but by a tedious preparation. About the latter end of autumn, the grub begins to perceive the approach of its transformation, it then buries itself deeper and deeper in the earth, sometimes six feet beneath the surface, and there forms itself a capacious apartment, the walls of which it renders very smooth and shining, by the excretions of its body. Its abode being thus formed, it begins soon after
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to shorten itself, to swell, and to burst its last skin, in order to assume the form of a chrysalis. This, in the beginning, appears of a yellowish colour, which heightens by degrees, till at last it is seen nearly red. Its exterior form plainly discovers all the vestiges of the future winged insect, all the fore parts being distinctly seen; while behind, the animal seems as if wrapped in swaddling-cloaths.

The young May-bug continues in this state for about three months longer, and it is not till the beginning of January that the aurelia divests itself of all its impediments, and becomes a winged insect, completely formed. Yet still the animal is far from attaining its natural strength, health, and appetite. It undergoes a kind of infant imbecility; and, unlike most other insects, that the instant they become flies are arrived at their state of full perfection, the May-bug continues feeble and sickly. Its colour is much brighter than in the perfect animal, all parts are soft, and its voracious nature seems for a while to have entirely forsaken it. As the animal is very often found in this state, it is supposed, by those unacquainted with its real history, that the old ones, of the former season, have buried themselves for the winter, in order to revisit the sun the ensuing summer. But the fact is, the old one never sur-
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vives the season, but dies, like all the other winged tribe of insects, from the severity of cold in winter.

About the latter end of May, these insects, after having lived for four years under ground, burst from the earth, when the first mild evening invites them abroad. They are at that time seen rising from their long imprisonment, from living only upon roots, and imbibing only the moisture of the earth, to visit the mildness of the summer air, to chuse the sweetest vegetables for their banquet, and to drink the dew of the evening. Wherever an attentive observer then walks abroad, he will see them bursting up before him in his pathway, like ghosts on a theatre. He will see every part of the earth, that had its surface beaten into hardness, perforated by their egression. When the season is favourable for them, they are seen by myriads buzzing along, hitting against every object that intercepts their flight. The mid-day sun, however, seems too powerful for their constitutions; they then lurk under the leaves and branches of some shady tree; but the willow seems particularly their most favourite food; there they lurk in clusters, and seldom quit the tree till they have devoured all its verdure. In those seasons which are favourable to their propagation they are seen in an evening as thick as flakes of snow, and hitting against every object

ject with a sort of capricious blindness. Their duration, however, is but short, as they never survive the season. They begin to join shortly after they have been let loose from their prison, and when the female is impregnated, she cautiously bores an hole in the ground, with an instrument fitted for that purpose, which she is furnished with at the tail, and there deposits her eggs, generally to the number of threescore. If the season and the soil be adapted to their propagation, these soon multiply as already described, and go through the noxious stages of their contemptible existence. This insect, however, in its worm state, though prejudicial to man, makes one of the chief repasts of the feathered tribe, and is generally the first nourishment with which they supply their young. Rooks and hogs are particularly fond of these worms, and devour them in great numbers. The inhabitants of the county of Norfolk, some time since, went into the practice of destroying their rookeries, but in proportion as they destroyed one plague, they were pestered with a greater; and these insects multiplied in such an amazing abundance, as to destroy not only the verdure of the fields, but even the roots of vegetables, not yet shot forth. One farm in particular was so injured by them in the year 1751, that the occupier was not able to pay his rent; and the landlord was not only content to lose his income for that

that year, but also gave money for the support of the farmer and his family. In Ireland they suffered so much by these insects, that they came to a resolution of setting fire to a wood, of some miles in extent, to prevent their mischievous propagation.

Of all the beetle kind this is the most numerous, and therefore deserves the chief attention of history. The numerous varieties of other kinds might repay the curiosity of the diligent observer, but we must be content in general to observe, that in the great out-lines of the history, they resemble those of which we have just been giving a description; like them, all other beetles are bred from the egg, which is deposited in the ground, or sometimes, though seldom, in the barks of trees, they change into a worm; they subsist in that state by living upon the roots of vegetables, or the succulent parts of the bark round them. They generally live a year at least before they change into an aurelia; in that state they are not entirely motionless, nor entirely swaddled up without form.

It would be tedious and endless to give a description of all, and yet it would be an unpardonable omission not to mention the particularities of some beetles, which are singular rather from their size, their manners, or their formation. That beetle which the Americans call

call the Tumble-dung, particularly demands our attention; it is all over of a dusky black, rounder than those animals are generally found to be, and so strong, though not much larger than the common black beetle, that if one of them be put under a brass candlestick, it will cause it to move backwards and forwards, as if it were by an invisible hand, to the admiration of those who are not accustomed to the sight; but this strength is given it for much more useful purposes than those of exciting human curiosity, for there is no creature more laborious, either in seeking subsistence, or in providing a proper retreat for its young. They are endowed with sagacity to discover subsistence by their excellent smelling, which directs them in flights to excrements just fallen from man or beast, on which they instantly drop, and fall unanimously to work in forming round balls or pellets thereof, in the middle of which they lay an egg. These pellets, in September, they convey three feet deep in the earth, where they lie till the approach of spring, when the eggs are hatched, the nests burst, and the insects find their way out of the earth. They assist each other with indefatigable industry, in rolling these globular pellets to the place where they are to be buried. This they are to perform with the tail foremost, by raising up their hinder part, and shoving along the ball with their hind feet.

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They are always accompanied with other beetles of a larger size, and of a more elegant structure and colour. The breast of this is covered with a shield of a crimson colour, and shining-like metal; the head is of the like colour, mixed with green, and on the crown of the head stands a shining black horn, bended backwards. These are called the kings of the beetles, but for what reason is uncertain, since they partake of the same dirty drudgery with the rest.

The Elephant-Beetle is the largest of this kind hitherto known, and is found in South-America, particularly Guiana and Surinam, as well as about the river Oroonoko. It is of a black colour, and the whole body is covered with a very hard shell, full as thick and as strong as that of a small crab. Its length, from the hinder part to the eyes, is almost four inches, and from the same part to the end of the proboscis, or trunk, four inches and three quarters. The transverse diameter of the body is two inches and a quarter, and the breadth of each elytron, or case for the wings, is an inch and three tenths. The antennæ or feelers, are quite horny; for which reason the proboscis or trunk is moveable at its insertion into the head, and seems to supply the place of feelers. The horns are eight tenths of an inch long, and terminate in points. The proboscis is an inch and a quarter long, and turns

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upwards, making a crooked line, terminating in two horns, each of which is near a quarter of an inch long; but they are not perforated at the end like the proboscis of other insects. About four tenths of an inch above the head, or that side next the body, is a prominence, or small horn, which if the rest of the trunk were away, would cause this part to resemble the horn of a rhinoceros. There is indeed a beetle so called, but then the horns or trunk has no fork at the end, though the lower horn resembles this. The feet are all forked at the end, but not like lobsters claws.

To this class we may also refer the Glow-worm, that little animal which makes such a distinguished figure in the descriptions of our poets. No two insects can differ more than the male and female of this species from each other. The male is in every respect a beetle, having cases to its wings, and rising in the air at pleasure; the female, on the contrary, has none, but is entirely a creeping insect, and is obliged to wait the approaches of her capricious companion. The body of the female has eleven joints, with a shield breast-plate, the shape of which is oval; the head is placed over this, and is very small, and the three last joints of her body are of a yellowish colour; but what distinguishes it from all other animals, at least in this part of the world, is the shining light
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which it emits by night, and which is supposed by some philosophers, to be an emanation which she sends forth to allure the male to her company. Most travellers who have gone through sandy countries must well remember the little shining sparks with which the ditches are studded on each side of the road. If incited by curiosity to approach more nearly, he will find the light sent forth by the glow-worm; if he should keep the little animal for some time, its light continues to grow paler, and at last appears totally extinct. The manner in which this light is produced has hitherto continued inexplicable; it is probable the little animal is supplied with some electrical powers, so that by rubbing the joints of its body against each other it thus supplies a stream of light which if it allures the male, as we are told, serves for very useful purposes.

The Cantharis is of the beetle kind, from whence come cantharides, well known in the shops by the name of Spanish flies, and for their use in blisters. They have feelers like bristles, flexible cases to the wings, a breast pretty plain, and the sides of the belly wrinkled. Cantharides differ from each other in their size, shape, and colour, those used in the shops also do the same. The largest in these parts are about an inch long, and as much in circumference, but others are not above three quarters of an inch. Some are

of a pure azure colour, others of pure gold, and others again have a mixture of pure gold and azure colours: but they are all very brilliant, and extremely beautiful. These insects, as is well known, are of the greatest benefit to mankind, making a part in many medicines conducive to human preservation. They are chiefly natives of Spain, Italy, and Portugal; but they are to be met with also about Paris in the summer time, upon the leaves of the ash, the poplar, and the rose-trees, and also among wheat, and in meadows. It is very certain that these insects are fond of ash-leaves, insomuch that they will sometimes strip one of these trees quite bare. Some affirm, that these flies delight in sweet-smelling herbs, and it is very certain, that they are fond of honey-suckles, lilac, and wild-cherry shrubs; but some that have sought after them declare, they never could find them on elder-trees, nut-trees, and among wheat. We are told that the country people expect the return of these insects every seven years. It is very certain, that such a number of these insects have been seen together in the air, that they appeared like swarms of bees; and that they have so disagreeable a smell, that it may be perceived a great way off, especially about sunset, though they are not seen at that time. This bad smell is a guide for those who make it their business to catch them. When they are caught
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they dry them, after which they are so light, that fifty will hardly weigh a dram. Those that gather them, tie them in a bag, or a piece of linen cloth, that has been well worn, and then they kill them with the vapours of hot vinegar, after which they dry them in the sun, and keep them in boxes. These flies, thus dried, being chymically analysed, yield a great deal of volatile caustic salt, mixed with a little oil, phlegm, and earth. Cantharides are penetrating, corrosive, and, applied to the skin, raise blisters, from whence proceeds a great deal of serosity. They are made use of both inwardly and outwardly. However it is somewhat strange that the effects of these flies should fall principally upon the urinary passages; for though some authors have endeavoured to account for this, we are still in the dark, for all they have said amounts to no more, than that they affect these parts in a manner which may be very learnedly described, but very obscurely comprehended.

An insect of great, though perhaps not equal use in medicine, is that which is known by the name of the Kermes; it is produced in the excrescence of an oak, called the berry-bearing ilex, and appears at first wrapt up in a membranaceous bladder, of the size of a pea, smooth and shining, of a brownish red colour, and covered with a very fine ash-coloured powder. This bag teems with a number of reddish eggs

or insects, which being rubbed with the fingers, pour out a crimson liquor. It is only met with in warm countries in the months of May and June. In the month of April this insect becomes of the size and shape of a pea, and its eggs some time after burst from the womb, and soon turning worms, run about the branches and leaves of the tree. They are of two sexes, and the females have been hitherto described; but the males are very distinct from the former, and are a sort of small flies like gnats, with six feet, of which the four forward are short, and the two backward long, divided into four joints, and armed with three crooked nails. There are two feelers on the head a line and an half long, which are moveable, streaked and articulated. The tail, at the back part of the body, is half a line long, and forked. The whole body is covered with two transparent wings, and they leap about in the manner of fleas. The harvest of the kermes is greater or less in proportion to the severity of the winter; and the women gather them before sun-rising, tearing them off with their nails, for fear there should be any loss from the hatching of the insects. They sprinkle them with vinegar, and lay them in the sun to dry, where they acquire a red colour.

An insect, perhaps, still more useful than either of the former, is the Cochineal, which
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has been variously described by authors; some have supposed it a vegetable excrescence from the tree upon which it is found; some have described it as a louse, some as a bug, and some as a beetle. As they appear in our shops when brought from America, they are of an irregular shape, convex on one side, and a little concave on the other; but are both marked with transverse streaks or wrinkles. They are of a scarlet colour within, and without of a blackish red, and sometimes of a white, reddish, or ash-colour, which are accounted the best, and are brought to us from Mexico. The cochineal insect is of an oval form, of the size of a small pea, with six feet, and a snout or trunk. It brings forth its young alive, and is nourished by sucking the juice of the plant. Its body consists of several rings, and when it is once fixed on the plant, it continues immovable, being subject to no change. Some pretend there are two sorts, the one domestic, which is best, and the other wild, that is of a vivid colour; however, they appear to be the same, only with this difference, that the wild feeds upon uncultivated trees, without any assistance, whereas the domestic is carefully, at a stated season, removed to cultivated trees, where it feeds upon a purer juice. Those who take care of these insects, place them on the prickly pear-plant in a certain order, and are very indus-

trious in defending them from other insects; for if any other kind come among them, they take care to brush them off with foxes tails. Towards the end of the year, when the rains and cold weather are coming on, which are fatal to these insects, they take off the leaves or branches covered with cochineal, that have not attained their utmost degree of perfection, and keep them in their houses till winter is past. These leaves are very thick and juicy, and supply them with sufficient nourishment, while they remain within doors. When the milder weather returns, and these animals are about to exclude their young, the natives make them nests, like those of birds, but less, of tree-moss, or soft hay, or the down of cocoa-nuts, placing twelve in every nest. These they fix on the thorns of the prickly pear-plant, and in three or four days time they bring forth their young, which leave their nests in a few days, and creep upon the branches of the plant, till they find a proper place to rest in, and take in their nourishment; and until the females are fecundated by the males, which, as in the former tribe, differ very widely, from the females being winged insects, whereas the others only creep, and are at most stationary. When they are impregnated, they produce a new offspring, so that the propagator has a new harvest thrice a year. When the native Americans have gathered the cochineal, they
put

put them into holes in the ground, where they kill them with boiling water, and afterwards dry them in the sun, or in an oven, or lay them upon hot plates. From the various methods of killing them, arise the different colours which they appear in when brought to us. While they are living, they seem to be sprinkled over with a white powder, which they lose as soon as the boiling water is poured upon them. Those that are dried upon hot plates are the blackest. What we call the cochineal are only the females, for the males are a sort of fly, as already observed in the kermes. They are used both for dying and medicine, and are said to have much the same virtue as the kermes, though they are now seldom used alone, but are mixed with other things for the sake of the colour.

I shall end this account of the beetle tribe with the history of an animal which cannot properly be ranked under this species, and yet which cannot be more methodically ranged under any other. This is the insect that forms and resides in the gall-nut, the spoils of which are converted to such useful purposes. The Gall Insects are bred in a sort of bodies adhering to a kind of oak in Asia, which differ with regard to their colour, size, roughness, smoothness and shape, and which we call galls. They are not fruit, as some have imagined, but preternatural tumours,

owing to the wounds given to the buds, leaves, and twigs of the tree, by a kind of insects that lay their eggs within them. This animal is furnished with an implement, by which the female penetrates into the bark of the tree, or into that spot which just begins to bud, and there sheds a drop of corrosive fluid into the cavity. Having thus formed a receptacle for her eggs, she deposits them in the place, and dies soon after. The heart of the bud being thus wounded, the circulation of the nutritive juice is interrupted, and the fermentation thereof, with the poison injected by the fly, burns the parts adjacent, and then alters the natural colour of the plant. The juice or sap, turned back from its natural course, extravasates and flows round the egg; after which it swells and dilates by the assistance of some bubbles of air, which get admission through the pores of the bark, and which run in the vessels with the sap. The external coat of this excrescence is dried by the air, and grows into a figure which bears some resemblance to the bow of an arch, or the roundness of a kernel. This little ball receives its nutriment, growth, and vegetation, as the other parts of the tree, by slow degrees, and is what we call the gall-nut. The worm that is hatched under this spacious vault, finds in the substance of the ball, which is as yet very tender, a subsistence suitable to its nature; gnaws and digests it

it till the time comes for its transformation to a nymph, and from that state of existence changes into a fly. After this the insect, perceiving itself duly provided with all things requisite, disengages itself soon from its confinement, and takes its flight into the open air. The case, however, is not similar with respect to the gall-nut that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its inclosure. The nut falls with the leaves, and although you may imagine that the fly which lies within is lost, yet in reality it is not so; on the contrary, its being covered up so close is the means of its preservation. Thus it spends the winter in a warm house, where every crack and cranny of the nut is well stopped up; and lies buried as it were under a heap of leaves, which preserves it from the injuries of the weather. This apartment, however, though so commodious a retreat in the winter, is a perfect prison in the spring. The fly, roused out of its lethargy by the first heats, breaks its way through, and ranges where it pleases. A very small aperture is sufficient, since at this time the fly is but a diminutive creature. Besides, the ringlets whereof its body is composed, dilate, and become pliant in the passage.

C H A P. VII.

Of the Gnat and the Tipula.

THERE are two insects which entirely resemble each other in their form, and yet widely differ in their habits, manners, and propagation. Those who have seen the Tipula, or Long-legs, and the larger kind of Gnat, have most probably mistaken the one for the other; they have often accused the tipula, a harmless insect, of depredations made by the gnat, and the innocent have suffered for the guilty; indeed the differences in their form are so very minute, that it often requires the assistance of a microscope to distinguish the one from the other: they are both mounted on long legs, both furnished with two wings and a slender body; their heads are large, and they seem to be hump-backed; the chief and only difference, therefore, is, that the tipula wants a trunk, while the gnat has a large one, which it often exerts to very mischievous purposes. The tipula is a harmless, peaceful insect, that offers injury to nothing; the gnat is sanguinary and predaceous, ever seeking out for a place in which to bury its trunk, and pumping up the blood from the animal in large quantities.

The gnat proceeds from a little worm, which
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is usually seen at the bottom of standing waters. The manner in which the insect lays its eggs is particularly curious; after having laid the proper number on the surface of the water, it surrounds them with a kind of unctuous matter, which prevents them from sinking; but at the same time fastens them with a thread to the bottom, to prevent their floating away, at the mercy of every breeze, from a place the warmth of which is proper for their production, to any other, where the water may be too cold, or the animal's enemies too numerous. Thus the insects, in their egg state, resemble a buoy, which is fixed by an anchor. As they come to maturity they sink deeper, and at last, when they leave the egg as worms, they creep at the bottom. They now make themselves lodgments of cement, which they fasten to some solid body at the very bottom of the water, unless, by accident, they meet with a piece of chalk, which being of a soft and pliant nature, gives them an opportunity of sinking a retreat for themselves, where nothing but the claws of a cray-fish can possibly molest them. The worm afterwards changes its form. It appears with a large head, and a tail invested with hair, and moistened with an oleaginous liquor, which she makes use of as a cork, to sustain her head in the air, and her tail in the water, and to transport her from one place to another. When the oil with which her tail

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is moistened begins to grow dry, she discharges out of her mouth an unctuous humour, which she sheds all over her tail, by virtue whereof she is enabled to transport herself where she pleases, without being either wet or any ways incommoded by the water. The gnat in her second state is, properly speaking, in her form of a nymph, which is an introduction or entrance into a new life. In the first place, she divests herself of her second skin; in the next she resigns her eyes, her antennæ, and her tail; in short, she actually seems to expire. However, from the spoils of the amphibious animal, a little winged insect cuts the air, whose every part is active to the last degree, and whose whole structure is the just object of our admiration. Its little head is adorned with a plume of feathers, and its whole body invested with scales and hair, to secure it from any wet or dust. She makes trial of the activity of her wings, by rubbing them either against her body, or her broad sidebags, which keep her in an equilibrium. The furbelow, or little border of fine feathers, which graces her wings, is very curious, and strikes the eye in the most agreeable manner. There is nothing, however, of greater importance to the gnat than her trunk, and that weak implement may justly be deemed one of nature's master-pieces. It is so very small, that the extremity of it can scarcely be discerned through
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the best microscope that can be procured. That part which is at first obvious to the eye, is nothing but a long scaly sheath under the throat. At near the distance of two thirds of it there is an aperture, through which the insect darts out four stings, and afterwards retracts them. One of which, however sharp and active it may be, is no more than the case in which the other three lie concealed, and run in a long groove. The sides of these stings are sharpened like two-edged swords; they are likewise barbed, and have a vast number of cutting teeth towards the point, which turns up like a hook, and is fine beyond expression. When all these darts are stuck into the flesh of animals, sometimes one after another, and sometimes all at once, the blood and humours of the adjacent parts must unavoidably be extravasated; upon which a tumour must consequently ensue, the little orifice whereof is closed up by the compression of the external air. When the gnat, by the point of her case, which she makes use of as a tongue, has tasted any fruit, flesh, or juice, that she has found out; if it be a fluid, she sucks it up, without playing her darts into it; but in case she finds the least obstruction by any flesh whatever, she exerts her strength, and pierces through it, if possibly she can. After this she draws back her stings into their sheath, which she applies to the wound in order to extract, as through a
reed,

reed, the juices which she finds inclosed. This is the implement with which the gnat performs her work in the summer, for during the winter she has no manner of occasion for it. Then she ceases to eat, and spends all that tedious season either in quarries or in caverns, which she abandons at the return of summer, and flies about in search after some commodious ford, or standing water, where she may produce her progeny, which would be soon washed away and lost, by the too rapid motion of any running stream. The little brood are sometimes so numerous, that the very water is tinged according to the colour of the species, as green, if they be green, and of a sanguine hue, if they be red.

These are circumstances sufficiently extraordinary in the life of this little animal; but it offers something still more curious in the method of its propagation. However similar insects of the gnat kind are in their appearance, yet they differ widely from each other in the manner in which they are brought forth, for some are oviparous, and are produced from eggs; some are viviparous, and come forth in their most perfect form; some are males, and unite with the female; some are females, requiring the impregnation of the male; some are of neither sex, yet still produce young, without any copulation whatsoever. This is one

of the strangest discoveries in all natural history! A gnat separated from the rest of its kind, and inclosed in a glass vessel, with air sufficient to keep it alive, shall produce young, which also, when separated from each other, shall be the parents of a numerous progeny. Thus, down for five or six generations, do these extraordinary animals propagate without the use of copulation, without any congress between the male and female, but in the manner of vegetables, the young bursting from the body of their parents, without any previous impregnation. At the sixth generation, however, their propagation stops, the gnat no longer produces its like, from itself alone, but it requires the access of the male to give it another succession of fecundity.

The gnat of Europe gives but little uneasiness; it is sometimes heard to hum about our beds at night, and keeps off the approaches of sleep by the apprehension it causes; but it is very different in the ill-peopled regions of America, where the waters stagnate, and the climate is warm, and where they are produced in multitudes beyond expression. The whole air is there filled with clouds of those famished insects; and they are found of all sizes, from six inches long, to a minuteness that even requires the microscope to have a distinct perception of them. The warmth of the mid-day
sun

fun is too powerful for their constitutions; but when the evening approaches, neither art nor flight can shield the wretched inhabitants from their attacks; though millions are destroyed, still millions more succeed, and produce unceasing torment. The native Indians, who anoint their bodies with oil, and who have from their infancy been used to their depredations, find them much less inconvenient than those who are newly arrived from Europe; they sleep in their cottages covered all over with thousands of the gnat kind upon their bodies, and yet do not seem to have their slumbers interrupted by their cruel devourers. If a candle happens to be lighted in one of those places, a cloud of insects at once light upon the flame, and extinguish it; they are therefore obliged to keep their candles in glass lanthorns; a miserable expedient to prevent an unceasing calamity!

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C H A P. VIII.

Of Zoophytes in General.

WE are now come to the last link in the chain of animated nature, to a class of beings so confined in their powers, and so defective in their formation, that some historians have been at a loss whether to consider them as a superior rank of vegetables, or the humblest order of the animated tribe. In order therefore to give them a denomination, agreeable to their existence, they have been called Zoophytes, a name implying vegetable nature endued with animal life; and, indeed, in some the marks of the animal are so few, that it is difficult to give their place in nature with precision, or to tell whether it is a plant or an insect that is the object of our consideration.

Should it be asked what it is that constitutes the difference between animal and vegetable life, what it is that lays the line that separates those two great kingdoms from each other, it would be difficult, perhaps we should find it impossible, to return an answer. The power of motion cannot form this distinction, since some vegetables are possessed of motion, and many animals are totally without it. The sensitive plant has obviously a greater variety of motions
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than the oyſter or the pholas. The animal that fills the acorn-shell is immoveable, and can only cloſe its lid to defend itſelf from external injury, while the flower, which goes by the name of the fly-trap, ſeems to cloſe upon the flies that light upon it, and that attempt to riſe it of its honey. The animal in this inſtance ſeems to have ſcarce a power of ſelf-defence; the vegetable not only guards its poſſeſſions, but ſeizes upon the robber that would venture to invade them. In like manner, the methods of propagation give no ſuperiority to the lower rank of animals. On the contrary, vegetables are frequently produced more conformably to the higher ranks of the creation; and though ſome plants are produced by cuttings from others, yet the general manner of propagation is from ſeeds, laid in the womb of the earth, where they are hatched into the ſimilitude of the parent plant or flower. But a moſt numerous tribe of animals have lately been diſcovered, which are propagated by cuttings, and this in ſo extraordinary a manner, that, though the original inſect be divided into a thouſand parts, each, however ſmall, ſhall be formed into an animal, entirely reſembling that which was at firſt divided; in this reſpect, therefore, certain races of animals ſeem to fall beneath vegetables, by their more imperfect propagation.

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What, therefore, is the distinction between them, or are the orders so intimately blended as that it is impossible to mark the boundaries of each? To me it would seem, that all animals are possessed of one power, of which vegetables are totally deficient; I mean either the actual ability, or an aukward attempt at self-preservation. However vegetables may seem possessed of this important quality, yet it is with them but a mechanical impulse, resembling the raising one end of the lever, when you depress the other: the sensitive plant contracts and hangs its leaves, indeed, when touched, but this motion no way contributes to its safety; the fly-trap flower acts entirely in the same manner; and though it seems to seize the little animal that comes to annoy it, yet, in reality, only closes mechanically upon it, and this inclosure neither contributes to its preservation nor its defence. But it is very different with insects, even of the lowest order; the earth-worm not only contracts, but hides itself in the earth, and escapes with some share of swiftness from its pursuers. The polypus hides its horns; the star-fish contracts its arms, upon the appearance even of distant dangers; they not only hunt for their food, but provide for their safety, and however imperfectly they may be formed, yet still they are in reality placed many degrees above the highest vegetable of the earth,
and

and are possessed of many animal functions, as well as those that are more elaborately formed.

But though these be superior to plants, they are very far beneath their animated fellows of existence. In the class of zoophytes, we may place all those animals, which may be propagated by cuttings, or in other words, which, if divided into two or more parts, each part in time becomes a separate and perfect animal; the head shoots forth a tail, and on the contrary, the tail produces an head; some of these will bear dividing but into two parts, such is the earth-worm; some may be divided into more than two, and of this kind are many of the star-fish; others still may be cut into a thousand parts, each becoming a perfect animal; they may be turned inside out, like the finger of a glove, they may be moulded into all manner of shapes, yet still their vivacious principle remains, still every single part becomes perfect in its kind, and after a few days existence, exhibits all the arts and industry of its contemptible parent! We shall, therefore, divide zoophytes according to their several degrees of perfection, namely, into Worms, Star-fish, and Polypi; contenting ourselves with a short review of those nauseous and despicable creatures, that excite our curiosity chiefly by their imperfections; it must not be concealed, however,

however, that much has of late been written on this part of natural history. A new mode of animal production, could not fail of exciting not only the curiosity, but the astonishment of every philosopher; many found their favourite systems totally overthrown by the discovery; and it was not without a wordy struggle, that they gave up what had formerly been their pleasure and their pride. At last, however, conviction became too strong for argument, and a question, which owed its general spread rather to its novelty, than to its importance, was given up in favour of the new discovery.

C H A P. IX.

Of Worms.

THE first in the class of zoophytes, are animals of the Worm kind, which being entirely destitute of feet, trail themselves along upon the ground, and find themselves a retreat under the earth, or in the water. As these, like serpents, have a creeping motion, so both, in general, go under the common appellation of reptiles; a loathsome, noxious, malignant tribe, to which man by nature, as well as by religion, has the strongest antipathy. But though worms, as well as serpents, are mostly without feet, and have been doomed to creep along the

earth on their bellies, yet their motions are very different. The serpent, as has been said before, having a back-bone which it is incapable of contracting, bends its body into the form of a bow, and then shoots forward from the tail; but it is very different with the worm, which has a power of contracting or lengthening itself at will. There is a spiral muscle, that runs round its whole body, from the head to the tail, somewhat resembling a wire wound round a walking-cane, which, when slipped off, and one end extended and held fast, will bring the other nearer to it; in this manner the earth-worm, having shot out, or extended its body, takes hold by the slime of the fore part of its body, and so contracts and brings forward the hinder part; in this manner it moves onward, not without great effort, but the occasions for its progressive motion are few.

As it is designed for living under the earth, and leading a life of obscurity, so it seems tolerably adapted to its situation. Its body is armed with small stiff sharp burrs or prickles, which it can erect or depress at pleasure; under the skin there lies a slimy juice, to be ejected as occasion requires, at certain perforations, between the rings of the muscles, to lubricate its body, and facilitate its passage into the earth. Like most other insects, it hath breathing-holes along the back, adjoining each ring; but it is without

out bones, without eyes, without ears, and, properly without feet. It has a mouth, and also an alimentary canal, which runs along to the very point of the tail. In some worms, however, particularly such as are found in the bodies of animals, this canal opens towards the middle of the belly, at some distance from the tail. The intestines of the earth-worm are always found filled with a very fine earth, which seems to be the only nourishment these animals are capable of receiving.

The animal is entirely without brain, but near the head is placed the heart, which is seen to beat with a very distinct motion, and round it are the spermatic vessels, forming a number of little globules, containing a milky fluid, which have an opening into the belly, not far from the head: they are also often found to contain a number of eggs, which are laid in the earth, and are hatched in twelve or fourteen days into life, by the genial warmth of their situation; like snails, all these animals unite in themselves both sexes at once, the reptile that impregnates, being impregnated in turn; few that walk out, but must have observed them with their heads laid against each other, and so strongly attached that they suffer themselves to be trod upon.

When the eggs are laid in the earth, which, in about fourteen days, as has been said, are

hatched into maturity, the young ones come forth very small, but perfectly formed, and suffer no change during their existence: how long their life continues is not well known, but it certainly holds for more than two or three seasons. During the winter, they bury themselves deeper in the earth, and seem, in some measure, to share the general torpidity of the insect tribe. In spring, they revive with the rest of nature, and on those occasions, a moist or dewy evening brings them forth from their retreats, for the universal purpose of continuing their kind. They chiefly live in a light rich and fertile soil, moistened by dews or accidental showers, but avoid those places where the water is apt to lie on the surface of the earth, or where the clay is too stiff for their easy progression underground.

Helpless as they are formed, yet they seem very vigilant in avoiding those animals that chiefly make them their prey; in particular, the mole, who feeds entirely upon them beneath the surface, and who seldom ventures, from the dimness of its sight, into the open air; him they avoid, by darting up from the earth, the instant they feel the ground move; and fishermen, who are well acquainted with this, take them in what numbers they chuse, by stirring the earth where they expect to find them. They are also driven from their retreats
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under ground, by pouring bitter or acrid water thereon, such as that water in which green walnuts have been steeped, or a ley made of pot-ashes.

Such is the general outline of the history of these reptiles, which, as it should seem, degrades them no way beneath the rank of other animals of the insect creation; but we now come to a part of their history, which proves the imperfection of their organs, from the easiness with which these little machines may be damaged and repaired again. It is well known in mechanics, that the finest and most complicated instruments are the most easily put out of order, and the most difficultly set right; the same also obtains in the animal machine. Man, the most complicated machine of all others, whose nerves are more numerous, and powers of action more various, is most easily destroyed: he is seen to die under wounds which a quadrupede or a bird could easily survive; and as we descend gradually to the lower ranks, the ruder the composition, the more difficult it is to disarrange it. Some animals live without their limbs, and often are seen to reproduce them; some are seen to live without their brain for many weeks together; caterpillars continue to increase and grow large, though all their nobler organs are entirely destroyed within; some animals continue to exist, though cut in two, their nobler

parts preserving life, while the others perish that were cut away; but the earth-worm, and all the zoophyte tribe, continue to live in separate parts, and one animal, by the means of cutting, is divided into two distinct existences, sometimes into a thousand.

There is no phænomenon in all natural history more astonishing than this, that man, at pleasure, should have a kind of creative power, and out of one life make two, each completely formed, with all its apparatus and functions, each with its perceptions, and powers of motion and self-preservation, each as complete in all respects as that from which it derived its existence, and equally enjoying the humble gratifications of its nature.

When Des Cartes first started the opinion, that brutes were machines, the discovery of this surprising propagation was unknown, which might, in some measure, have strengthened his fanciful theory. What is life, in brutes, he might have said, or where does it reside? In some we find it so diffused, that every part seems to maintain a vivacious principle, and the same animal appears possessed of a thousand distinct irrational souls at the same time. But let us not, he would say, give so noble a name to such contemptible powers, but rank the vivifying principle in these with the sap that rises in vegetables, or the moisture that contracts a cord,
or

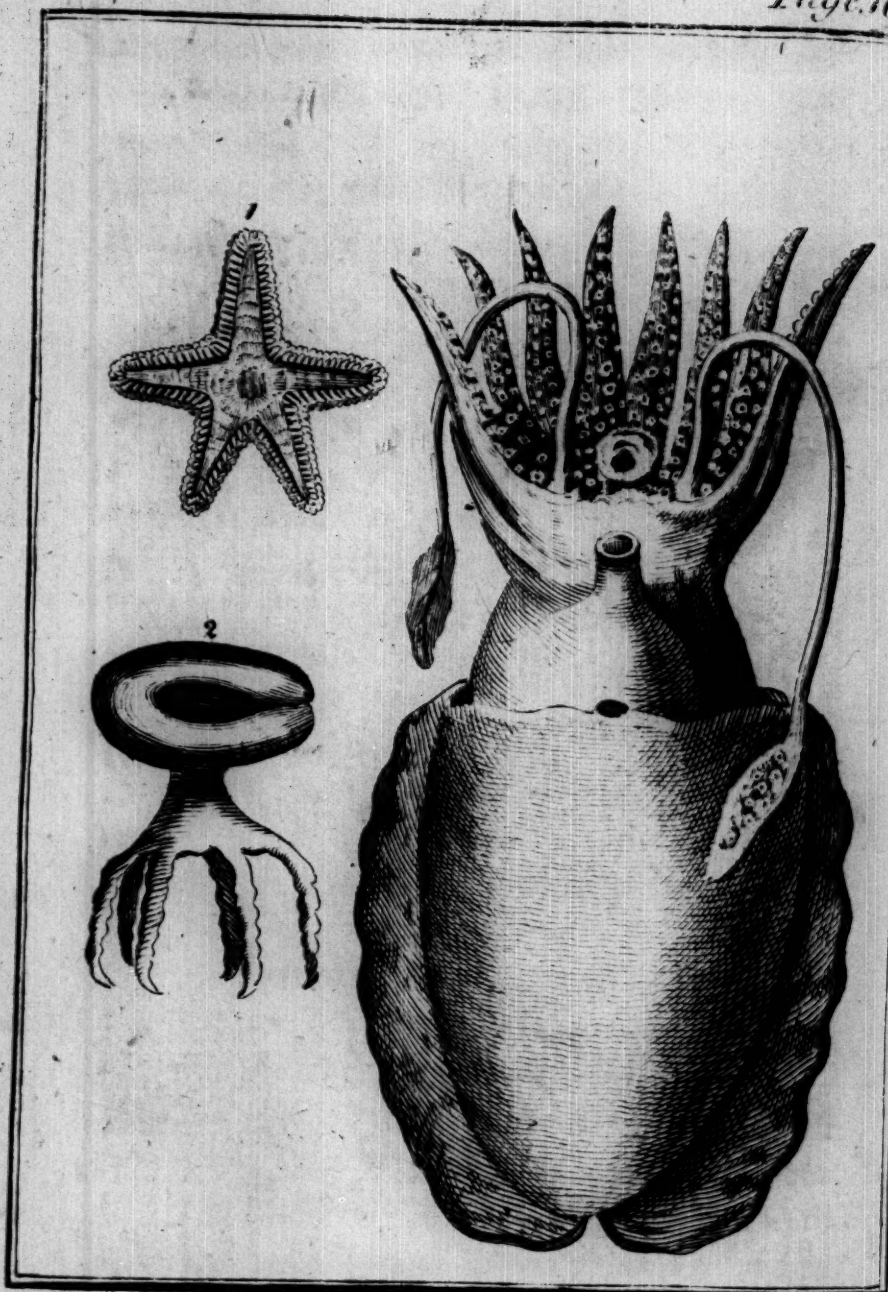
or the heat that puts water into motion! Nothing, in fact, deserves the name of soul, but that which reasons, that which understands, and by knowing God, receives the mark of its currency, and is minted with the impress of its great Creator.

Such might have been the speculations of this philosopher: however, to leave theory, it will be sufficient to say that we owe the first discovery of this power of reproduction in animals to Mr. Trembley, who first observed it in the polypus; and after him, Spalanzani and others found it taking place in the earth-worm, the sea-worm, and several other ill-formed animals of a like kind, which were susceptible of this new mode of propagation. This last philosopher has tried several experiments upon the earth-worm, many of which succeeded according to his expectation; every earth-worm, however, did not retain the vivacious principle with the same obstinacy; some, when cut in two, were entirely destroyed; others survived only in the nobler part; and while the head was living the tail entirely perished, and a new one was seen to burgeon from the extremity. But what was most surprising of all, in some, particularly in the small red-headed earth-worm, both extremities survived the operation; the head produced a tail with the anus, the intestines, the annular muscle, and the prickly beards; the tail part, on

the other hand, was seen to shoot forth the nobler organs, and in less than the space of three months sent forth a head, a heart, with all the apparatus and instruments of generation. This part, as may easily be supposed, was produced much more slowly than the former, a new head taking above three or four months for its completion, a new tail being shot forth in less than as many weeks. Thus two animals, by dissection, were made out of one, each with their separate appetites, each endued with life and motion, and seemingly as perfect as that single animal from whence they derived their origin.

What was performed upon the earth-worm, was found to obtain also in many of the vermicular species. The sea-worm, the white water-worm, and many of those little worms with feelers, found at the bottom of dirty ditches; in all these the nobler organs are of such little use, that if taken away, the animal does not seem to feel the want of them; it lives in all its parts, and in every part, and by a strange paradox in nature, the most useless and contemptible life is of all others the most difficult to destroy.





The Cuttle Fish.

C. Martin sculp.

1 The Sea Star.

2 The Sea Nettle.

C H A P. X.

Of the Star-fish.

THE next order of zoophytes is that of the Star-fish, a numerous tribe, shapeless and deformed, assuming at different times different appearances. The same animal that now appears round like a ball, shortly after flattens as thin as a plate. All of this kind are formed of a semi-transparent gelatinous substance, covered with a thin membrane, and, to an inattentive spectator, often appear like a lump of inanimate jelly, floating at random upon the surface of the sea, or thrown by chance on shore at the departure of the tide. But upon a more minute inspection, they will be found possessed of life and motion; they will be found to shoot forth their arms in every direction, in order to seize upon such insects as are near, and to devour them with great rapacity. Worms, the spawn of fish, and even muscles themselves, with their hard resisting shell, have been found in the stomachs of these voracious animals; and what is very extraordinary, though the substance of their own bodies be almost as soft as water, yet they are no way injured by swallowing these shells, which are almost of a stony hardness. They increase in size as all other animals

animals do. In summer, when the water of the sea is warmed by the heat of the sun, they float upon the surface, and in the dark they send forth a kind of shining light resembling that of phosphorus. Some have given these animals the name of sea-nettles, because they burn the hands of those that touch them, as nettles are found to do. They are often seen fastened to the rocks, and to the largest sea-shells, as if to derive their nourishment from them. If they be taken and put into spirit of wine, they will continue for many years entire, but if they be left to the influence of the air, they are, in less than four-and-twenty hours, melted down into limpid and offensive water.

In all of this species, none are found to possess a vent for their excrements, but the same passage by which they devour their food, serves for the ejection of their fæces. These animals, as was said, take such a variety of figures, that it is impossible to describe them under one determinate shape; but in general, their bodies resemble a truncated cone, whose base is applied to the rock to which they are found usually attached. Though generally transparent, yet they are found of different colours, some inclining to green, some to red, some to white, and some to brown. In some, their colours appear diffused over the whole surface, in some, they are often streaked, and in others often spotted. They are

are possess of a very slow progressive motion, and in fine weather, they are continually seen, stretching out and fishing for their prey. Many of them are possess of a number of long slender filaments, in which they entangle any small animals they happen to approach, and thus draw them into their enormous stomachs, which fill the whole cavity of their bodies. The harder shells continue for some weeks undigested, but at length, they undergo a kind of maceration in the stomach, and become a part of the substance of the animal itself. The indigestible parts are returned by the same aperture by which they were swallowed, and then the starfish begins to fish for more. These also may be cut in pieces, and every part will survive the operation; each becoming a perfect animal, endued with its natural rapacity. Of this tribe, the number is various, and the description of each would be tedious and uninteresting; the manners and nature of all, are nearly as described; but I will just make mention of one creature, which, though not properly belonging to this class, yet is so nearly related, that the passing it in silence would be an unpardonable omission.

Of all other animals, the Cuttle-fish, though in some respects superior to this tribe, possesses qualities the most extraordinary. It is about two feet long, covered with a very thin skin,

and its flesh composed of a gelatinous substance, which however within side is strengthened by a strong bone, of which such great use is made by the goldsmith. It is possessed of eight arms, which it extends, and which are probably of service to it in fishing for its prey; while in life, it is capable of lengthening or contracting these at pleasure; but when dead, they contract and lose their rigidity. They feed upon small fish, which they seize with their arms; and they are bred from eggs, which are laid upon the weeds along the sea-shore.

The cuttle-fish is found along many of the coasts of Europe, but are not easily caught, from a contrivance with which they are furnished by nature; this is a black substance, of the colour of ink, which is contained in a bladder generally on the left-side of the belly, and which is ejected in the manner of an excrement from the anus. Whenever therefore this fish is pursued, and when it finds a difficulty of escaping, it spurts forth a great quantity of this black liquor, by which the waters are totally darkened; and then it escapes, by lying close at the bottom. In this manner the creature finds its safety, and men find ample cause for admiration, from the great variety of stratagems with which creatures are endued for their peculiar preservation.

C H A P. XI.

Of the Polypus.

THOSE animals which we have described in the last chapter, are variously denominated. They have been called the Star-fish, Sea-nettles, and Sea-polypi. This last name has been peculiarly ascribed to them by the ancients, because of the number of feelers or feet of which they are all possess, and with which they have a slow progressive motion; but the moderns have given the name of Polypus to a reptile that lives in fresh water, by no means so large or observable. These are found at the bottom of wet ditches, or attached to the under surface of the broad-leaved plants that grow and swim on the waters. The same difference holds between these and the sea-water polypus, as between all the productions of the sea, and of the land and the ocean. The marine vegetables and animals grow to a monstrous size. The eel, the pike, or the bream of fresh-waters, is but small; but in the sea, they grow to an enormous magnitude. The herbs of the field are at most but a few feet high; those of the sea often shoot forth a stalk of an hundred. It is so between the polypi of both elements. Those of the sea are found from two feet in length to
three

three or four, and Pliny has even described one, the arms of which were no less than thirty feet long. Those in fresh waters, however, are comparatively minute; at their utmost size, seldom above three parts of an inch long, and when gathered up into their usual form, not above a third even of those dimensions.

It was upon these minute animals, that the power of dissection was first tried in multiplying their numbers. They had been long considered as little worthy the attention of observers, and were consigned to that neglect in which thousands of minute species of insects remain to this very day. It is true, indeed, that Reaumur observed, classed, and named them. By contemplating their motions, he was enabled distinctly to pronounce on their being of the animal, and not of the vegetable kingdom; and he called them polypi, from their great resemblance to those larger ones that were found in the ocean. Still, however, their properties were neglected, and their history unknown.

Mr. Trembley was the person to whom we owe the first discovery of the amazing properties and powers of this little vivacious creature; he divided this class of animals into four different kinds; into those inclining to green, those of a brownish cast, those of flesh colour, and those which he calls the polype de panache. The differences of structure in these, as also of colour,

lour, are observable enough; but the manner of their subsisting, of seizing their prey, and of their propagation, is pretty nearly the same in all.

Whoever has looked with care into the bottom of a wet ditch, when the water is stagnant, and the sun has been powerful, may remember to have seen many little transparent lumps of jelly, about the size of a pea, and flattened on one side; such also as have examined the under side of the broad-leaved weeds that grow on the surface of the water, must have observed them studded with a number of these little jelly-like substances, which were probably then disregarded, because their nature and history was unknown. These little substances, however, were no other than living polypi gathered up into a quiescent state, and seemingly inanimate, because either undisturbed, or not excited by the calls of appetite to action. When they are seen exerting themselves they put on a very different appearance from that when at rest; to conceive a just idea of their figure, we may suppose the finger of a glove cut off at the bottom; we may suppose also several threads or horns planted round the edge like a fringe. The hollow of this finger will give us an idea of the stomach of the animal, the threads issuing forth from the edges may be considered as the arms or feelers, with which it hunts for
its

its prey. The animal, at its greatest extent, is seldom seen above an inch and an half long, but it is much shorter when it is contracted and at rest; it is furnished neither with muscles nor rings, and its manner of lengthening or contracting itself more resembles that of the snail, than worms, or any other insect. The polypus contracts itself more or less, in proportion as it is touched, or as the water is agitated in which they are seen. Warmth animates them, and cold benumbs them; but it requires a degree of cold approaching congelation before they are reduced to perfect inactivity; those of an inch have generally their arms double, often thrice as long as their bodies. The arms, where the animal is not disturbed, and the season not unfavourable, are thrown about in various directions, in order to seize and entangle its little prey; sometimes three or four of the arms are thus employed, while the rest are contracted like the horns of a snail, within the animal's body. It seems capable of giving what length it pleases to these arms; it contracts and extends them at pleasure, and stretches them only in proportion to the remoteness of the object it would seize.

These animals have a progressive motion, which is performed by that power they have of lengthening and contracting themselves at pleasure; they go from one part of the bottom to another;

another; they mount along the margin of the water, and climb up the side of aquatic plants. They often are seen to come to the surface of the water, where they suspend themselves by their lower end. As they advance but very slowly, they employ a great deal of time in every action, and bind themselves very strongly to whatever body they chance to move upon as they proceed; their adhesion is voluntary, and is probably performed in the manner of a cupping-glass applied to the body.

All animals of this kind have a remarkable attachment to turn towards the light, and this naturally might induce an enquirer to look for their eyes; but however carefully this search has been pursued, and however excellent the microscope with which every part was examined, yet nothing of the appearance of this organ was found over the whole body; and it is most probable that, like several other insects which hunt their prey by their feeling, these creatures are unfurnished with advantages which would be totally useless for their support.

In the center of the arms, as was said before, the mouth is placed, which the animal can open and shut at pleasure, and this serves at once as a passage for food, and an opening for it after digestion. The inward part of the animal's body seems to be one great stomach, which is open at both ends; but the purposes which the
opening

opening at the bottom serves are hitherto unknown, but certainly not for excluding their excrements, for those are ejected at the aperture by which they are taken in. If the surface of the body of this little creature be examined with a microscope, it will be found studded with a number of warts, as also the arms, especially when they are contracted; and these tubercles, as we shall presently see, answer a very important purpose.

If we examine their way of living, we shall find these insects chiefly subsisting upon others, much less than themselves; particularly a kind of millepedes that live in the water, and a very small red worm, which they seize with great avidity. In short, no insect whatsoever, less than themselves, seems to come amiss to them: their arms, as was observed above, serve them as a net would a fisherman, or perhaps, more exactly speaking, as a lime-twigg does a fowler. Wherever their prey is perceived, which the animal effects by its feeling, it is sufficient to touch the object it would seize upon, and it is fastened without a power of escaping. The instant one of this insect's long arms is laid upon a millepede, the little insect sticks without a possibility of retreating. The greater the distance at which it is touched, the greater is the ease with which the polypus brings the prey to its mouth. If the little object be near, though irretrievably

Irretrievably caught, it is not without great difficulty that it can be brought to the mouth and swallowed. When the polypus is unsupplied with prey, it testifies its hunger by opening its mouth; the aperture, however, is so small that it cannot be easily perceived; but when, with any of its long arms, it has seized upon its prey, it then opens the mouth distinctly enough, and this opening is always in proportion to the size of the animal which it would swallow; the lips dilate insensibly by small degrees, and adjust themselves precisely to the figure of their prey. Mr. Trembley, who took a pleasure in feeding this useless brood, found that they could devour aliments of every kind, fish and flesh as well as insects; but he owns they did not thrive so well upon beef and veal, as upon the little worms of their own providing. When he gave one of these famished reptiles any substance which was improper to serve for aliment, at first it seized the prey with avidity, but after keeping it some time entangled near the mouth, it let drop again with distinguishing nicety.

When several polypi happen to fall upon the same worm, they dispute their common prey with each other. Two of them are often seen seizing the same worm at different ends, and dragging it at opposite directions with great force. It often happens that while one is swallowing

lowing its respective end, the other is also employed in the same manner, and thus they continue swallowing each his part, until their mouths meet together; they then rest, each for some time in this situation, till the worm breaks between them, and each goes off with his share; but it often happens, that a seemingly more dangerous combat ensues, when the mouths of both are thus joined upon one common prey together: the largest polypus then gapes and swallows his antagonist; but what is very wonderful, the animal thus swallowed seems to be rather a gainer by the misfortune. After it has lain in the conqueror's body for about an hour, it issues unhurt, and often in possession of the prey which had been the original cause of contention; how happy would it be for men, if they had as little to fear from each other!

These reptiles continue eating the whole year, except when the cold approaches to congelation; and then, like most others of the insect tribe, they feel the general torpor of nature, and all their faculties are for two or three months suspended; but if they abstain at one time, they are equally voracious at another, and like snakes, ants, and other animals that are torpid in winter, the meal of one day suffices them for several months together. In general, however, they devour more largely in proportion to their size, and their growth is quick exactly as they

are fed; such as are best supplied, soonest acquire their largest size, but they diminish also in their growth with the same facility, if their food be taken away.

Such are the more obvious properties of these little animals, but the most wonderful still remain behind: their manner of propagation, or rather multiplication, has for some years been the astonishment of all the learned of Europe. They are produced in as great a variety of manners as every species of vegetable. Some polypi are propagated from eggs, as plants are from their seed; some are produced by buds issuing from their bodies, as plants are produced by inoculation, while all may be multiplied by cuttings, and this to a degree of minuteness that exceeds even philosophical perseverance.

With respect to such of this kind as are hatched from the egg, little curious can be added, as it is a method of propagation so common to all the tribes of insect nature; but with regard to such as are produced like buds from their parent stem, or like cuttings from an original root, their history requires a more detailed explanation. If a polypus be carefully observed in summer, when these animals are chiefly active, and more particularly prepared for propagation, it will be found to burgeon forth from different parts of its body several tubercles or
little

little knobs, which grow larger and larger every day; after two or three days inspection, what at first appeared but a small excrescence takes the figure of a small animal, entirely resembling its parent, furnished with feelers, a mouth, and all the apparatus for seizing and digesting its prey. This little creature every day becomes larger, like the parent, to which it continues attached; it spreads its arms to seize upon whatever insect is proper for aliment, and devours it for its own particular benefit; thus it is possessed of two sources of nourishment, that which it receives from the parent by the tail, and that which it receives from its own industry by the mouth. The food which these animals receive often tinctures the whole body, and upon this occasion the parent is often seen communicating a part of its own fluids to that of its progeny that grows upon it; while, on the contrary, it never receives any tincture from any substance that is caught and swallowed by its young. If the parent swallows a red worm, which gives a tincture to all its fluids, the young one partakes of the parental colour; but if the latter should seize upon the same prey, the parent polypus is no way benefited by the capture, but all the advantage remains with the young one.

But we are not to suppose that the parent is capable of producing only one at a time, several

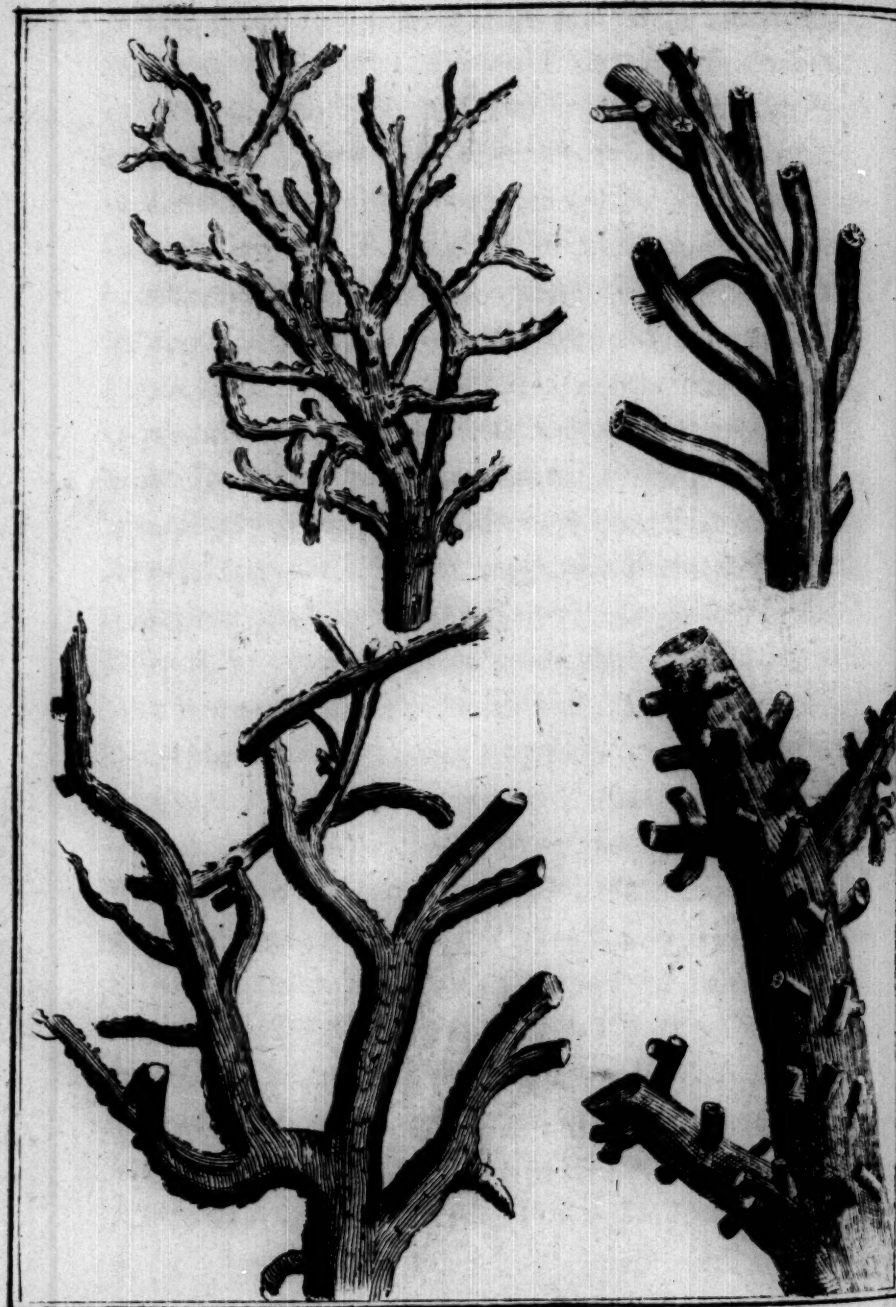
veral young ones are thus seen at once, of different sizes, growing from its body, some just budding forth, others acquiring their perfect form, and others come to sufficient maturity, and just ready to drop from the original stem to which they had been attached for several days. But what is more extraordinary still, those young ones themselves that continue attached to their parent, are seen to burgeon, and propagate their own young ones also, each holding the same dependence upon its respective parent, and possessed of the same advantages, that have been already described in the first connection. Thus we see a surprising chain of existence continued, and numbers of animals naturally produced without any union of the sexes, or other previous disposition of nature.

This seems to be the most natural way by which these insects are multiplied; their production from the egg being not so common; and though some of this kind are found with a little bladder attached to their bodies, which is supposed to be filled with eggs, which afterwards come to maturity, yet the artificial method of propagating these animals, is much more expeditious, and equally certain: it is indifferent whether one of them be cut into ten, or ten hundred parts, each becomes as perfect an animal as that which was originally divided; but

it must be observed, that the smaller the part which is thus separated from the rest, the longer it will be in coming to maturity, or in assuming its perfect form. It would be endless to recount the many experiments that have been tried upon this philosophical prodigy; the animal has been twisted and turned into all manner of shapes; it has been turned inside out, it has been cut in every division, yet still it continued to move; its parts adapted themselves again to each other, and in a short time it became as voracious and industrious as before.

Besides these kinds mentioned by Mr. Trembley, there are various others which have been lately discovered by the vigilance of succeeding observers, and some of these so strongly resemble a flowering vegetable in their forms, that they have been mistaken by many naturalists for such. Mr. Hughes, the author of the Natural History of Barbadoes, has described a species of this animal, but has mistaken its nature, and called it a sensitive flowering plant; he observed it to take refuge in the holes of rocks, and when undisturbed, to spread forth a number of ramifications, each terminated by a flowery petal which shrunk at the approach of the hand, and withdrew into the hole from whence before it had been seen to issue. This plant however was no other than an animal of the polypus kind,
which





The Coral-plants.

C. Martin sculp

which is not only to be found in Barbadoes, but also on many parts of the coast of Cornwall, and along the shores of the Continent.

C H A P. XII.

Of Lythophytes and Sponges.

IT is very probable that the animals we see, and are acquainted with, bear no manner of proportion to those that are concealed from us. Although every leaf and vegetable swarms with animals upon land, yet at sea they are still more abundant; for the greatest part of what would seem vegetables growing there are in fact nothing but the artificial formation of insects, palaces which they have built for their own habitation.

If we examine the bottom of the sea along some shores, and particularly at the mouths of several rivers, we shall find it has the appearance of a forest of trees under water, millions of plants growing in various directions, with their branches entangled in each other, and sometimes standing so thick as to obstruct navigation. The shores of the Persian gulph, the whole extent of the Red-sea, and the western coasts of America, are so choaked up in many places with these coralline substances, that though ships force a passage through them, boats

and swimmers find it impossible to make their way. These aquatic groves are formed of different substances, and assume various appearances. The coral plants, as they are called, sometimes shoot out like trees without leaves in winter; they often spread out a broad surface like a fan, and not uncommonly a large bundling head, like a faggot; sometimes they are found to resemble a plant with leaves and flowers; and often the antlers of a stag, with great exactness and regularity. In other parts of the sea are seen sponges of various magnitude, and extraordinary appearances, assuming a variety of phantastic forms like large mushrooms, mitres, fonts, and flower-pots. To an attentive spectator these various productions seem entirely of the vegetable kind; they seem to have their leaves and their flowers, and have been experimentally known to shoot out branches in the compass of a year. Philosophers, therefore, till of late, thought themselves pretty secure in ascribing these productions to the vegetable kingdom; and Count Marfigli, who has written very laboriously and learnedly upon the subject of corals and sponges, has not hesitated to declare his opinion, that they were plants of the aquatic kind, furnished with flowers and seed, and endued with a vegetation entirely resembling that which is found upon land. This opinion, however, some time after, began to be shaken

shaken by Rumphius and Jussieu, and at last by the ingenious Mr. Ellis, who by a more sagacious and diligent enquiry into nature, put it past doubt, that corals and sponges were entirely the work of animals, and that like the honeycomb, which was formed by the bee, the coral was the work of an infinite number of reptiles of the polypus kind, whose united labours were thus capable of filling whole tracts of the ocean with those embarrassing tokens of their industry.

If in our researches after the nature of these plants, we should be induced to break off a branch of the coraline substance, and observe it carefully, we shall perceive its whole surface, which is very rugged and irregular, covered with a mucous fluid, and almost in every part fludded with little jelly-like drops, which when closely examined, will be found to be no other than reptiles of the polypus kind. These have their motions, their arms, their appetites exactly resembling those described in the last chapter, but they soon expire when taken out of the sea, and our curiosity is at once stopped in its career, by the animals ceasing to give any marks of their industry; recourse therefore has been had to other expedients, in order to determine the nature of the inhabitant, as well as the habitation.

If a coraline plant be strictly observed, while

still growing in the sea, and the animals upon its surface be not disturbed, either by the agitation of the waters, or the touch of the observer, the little polypi will then be seen in infinite numbers, each issuing from its cell, and in some kinds, the head covered with a little shell resembling an umbrella, the arms spread abroad, in order to seize its prey, while the hinder part still remains attached to its habitation, from whence it never wholly removes. By this time it is perceived that the number of inhabitants is infinitely greater than was at first suspected; that they are all assiduously employed in the same pursuits, and that they issue from their respective cells, and retire into them at pleasure. Still, however, there are no proofs that those large branches which they inhabit are entirely the construction of such feeble and minute animals. But chemistry will be found to lend a clue to extricate us from our doubts in this particular. Like the shells which are formed by snails, muscles and oysters, these coralline substances effervesce with acids, and may therefore well be supposed to partake of the same animal nature. But Mr. Ellis went still farther, and examined their operations, just as they were beginning. Observing an oyster-bed which had been for some time neglected, he there perceived the first rudiments of a coralline plantation, and tufts of various kinds shooting from different parts

parts of this favourable soil. It was upon these he tried his principal experiment. He took out the oysters which were thus furnished with corallines, and placed them in a large wooden vessel, covering them with sea-water. In about an hour he perceived the animals, which before had been contracted by handling, and had shewn no signs of life, expanding themselves in every direction, and appearing employed in their own natural manner. Perceiving them therefore in this state, his next aim was to preserve them thus expanded, so as to be permanent objects of curiosity. For this purpose he poured, by slow degrees, an equal quantity of boiling water into the vessel of sea-water in which they were immersed. He then separated each polypus with pincers from its shell, and plunged each separately into small crystal vases, filled with spirit of wine mixed with water. By this means the animal was preserved entire, without having time to contract itself, and he thus perceived a variety of kinds, almost equal to that variety of productions which these little animals are seen to form. He has been thus able to perceive and describe fifty different kinds, each of which is seen to possess its own peculiar mode of construction, and to form a coralline that none of the rest can imitate. It is true indeed, that on every coralline substance there are a number of polypi found, no way resembling those which are the erectors of the

building; these may be called a vagabond race of reptiles, that are only intruders upon the labours of others, and that take possession of habitations, which they have neither art nor power to build for themselves. But in general, the same difference that subsists between the honeycomb of the bee, and the paper-like cells of the wasp, subsists between the different habitations of the coral-making polypi.

With regard to the various forms of these substances, they have obtained different names from the nature of the animal that produced them, or the likeness they bear to some well-known object, such as coralines, fungimadrepores, sponges, astroites, and keratophytes. Though these differ extremely in their outward appearances, yet they are all formed in the same manner by reptiles of various kinds and nature. When examined chemically, they all discover the marks of animal formation; the corals, as was said, dissolve in acids, the sponges burn with an odour strongly resembling that of burnt horn. We are left somewhat at a loss with regard to the precise manner in which this multitude of cells, which at last assume the appearance of a plant or flower, are formed. If we may be led in this subject by analogy, it is most probable, that the substance of coral is produced in the same manner that the shell of the snail grows round it; these little reptiles are each possessed of
a slimy

a slimy matter, which covers its body, and this hardening, as in the snail, becomes an habitation exactly fitted to the body of the animal that is to reside in it; several of these habitations being joined together, form at length a considerable mass, and as most animals are productive, in proportion to their minuteness, so these multiplying in a surprising degree, at length form those extensive forests that cover the bottom of the deep.

Thus all nature seems replete with life; almost every plant on land has its surface covered with millions of these minute creatures, of whose existence we are certain, but of whose uses we are entirely ignorant; while numbers of what seem plants at sea are not only the receptacles of insects, but also entirely of insect formation. This might have led some late philosophers into an opinion, that all nature was animated, that every, even the most inert mass of matter, was endued with life and sensation, but wanted organs to make those sensations perceptible to the observer: those opinions, taken up at random, are difficultly maintained, and as difficultly refuted; like combatants that meet in the dark, each party may deal a thousand blows without ever reaching the adversary. Those perhaps are wiser who view nature as she offers; who without searching too deeply

into the recesses in which she ultimately hides, are contented to take her as she presents herself, and storing their minds with effects, rather than with causes, instead of the embarrassment of systems, about which few agree, are contented with the history of appearances, concerning which all mankind have but one opinion.



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- Bag*, name of the false belly of the opossum—its description, iv. 228.
- Bag*, or pouch of the civet. See *Civet*.
- Bait*, the best for all kinds of fish is fresh herring—the larger sort will take a living small fish upon the hook sooner than any other bait, vi. 232.
- Balance*, to determine the specific gravity of metals, i. 176.
- Balearic crane*, its description—the real crane of Pliny—comes from the coast of Africa and Cape de Verd islands—its habits—has been described by the name of sea-peacock—foreign birds of the crane kind described, the jabiru, the jabiru-guacu, the anhima, and the buffoon bird, v. 344 to 347.
- Ball of fire* of the bigness of a bomb—its effects, i. 354.
- Baltic*, the Danes in possession of it, i. 217.
- Banana*, the elephant eats this plant to the roots, iv. 242.
- Banks* of a river, after inundations, appear above water, when all the adjacent valley is overflown, and why, i. 188, 189.
- Barb*, an Arabian horse bred in Barbary, ii. 326.
- Barbary hen*, its description, v. 172.
- Barble*, a flat fish, its growth, vi. 310.
- Barbs* of the whale, or whale-bone, vi. 177.
- Barja*, in South America, cattle destroyed at that place by the American bats called vampyres, iv. 136.
- Baris*. See *Apes*, iv. 185.
- Barnacle*, imaginary, a shell-fish, vii. 59.
- Barock*, in the kingdom of Cambaya, flocks of peacocks seen in the fields near that city, v. 157.
- Barometer*, serviceable in measuring the heights of mountains, i. 143—measures the weight of the air—in

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Bat, as big as a rabbit, ii. 5—by some reckoned among birds, 287—doubtful among naturalists whether beast or bird—now universally take place among quadrupedes—Pliny, Gesner, and Aldrovandus placed it among birds—scarce in any particular resembles the bird, except the power of sustaining itself in the air—description of the common sort in England—its intestines and skeleton, in some measure, resemble those of mankind—makes its first appearance early in summer, and begins its flight in the evening—is seen to skim along the surface of waters—feeds upon gnats, moths, and nocturnal insects of every kind, which it pursues open-mouthed—its flight laborious, irregular, and, if interrupted, not readily followed by a second elevation—usually taken, when striking against an object it falls to the ground—even in the summer, it sleeps the greatest part of the time—its retreat—continues in a torpid state during winter—is usually hanging by its hooked claws to the roofs of caves, unaffected by all change of weather—is destroyed particularly by the owl—the bat couples and brings forth in summer from two to five young at a time—the female has two nipples forward on the breast, as in the human kind, and this a motive for Linnaeus to give it the title of a primas, to rank it in the same order with mankind—the female makes no nest for her young—when she begins to grow hungry, and finds a necessity of stirring abroad, she takes her little ones and flicks them by their hooks against the sides of her apartment, and there they immoveably cling, and patiently wait her return—
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less similitude to the race of birds than of quadrupeds—great labour in flying soon fatigues, and tires it in less than an hour—its petty thefts upon the fat of bacon—long-eared bat—horse-shoe bat—rhinoceros bat—a larger race of bats in the East and West Indies truly formidable—a dangerous enemy—when united in flocks they become dreadful—they are eat—the negroes of the African coasts will not eat them though starving—on the African coast they fly in such numbers, as to obscure the setting sun—the roussette, or great bat of Madagascar, is found along the coasts of Africa and Malabar, where it is often seen about the size of a large hen—destroys the ripe fruits, and sometimes settles upon animals, and man himself—destroys fowls and domestic animals, unless preserved with the utmost care, and often fasten upon the inhabitants, attack them in the face, and make terrible wounds—the ancients have taken their idea of harpies from these fierce and voracious creatures, equally deformed, greedy, uncleanly, and cruel—the bat, called the American vampyre—its description by Ulloa—purport of his account confirmed by various travellers, who all agree that it has a faculty of drawing blood from persons sleeping, and destroying them before they awake—a strong difficulty remains how they make the wound—Ulloa and Buffon's opinions, suppose the animal endowed with a strong power of suction; and that, without inflicting any wound, by continuing to draw, it enlarges the pores of the skin, so that the blood at length passes—they are one of the great pests of South America, iv. 125 to 136—Found in the holes deserted by the wood-pecker, v. 223, 224.

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Beam, by hunters meant that part which bears the antlers, iii. 105.

Beams, those of the sun shining upon the fire, put it out, and why—darting directly upon us, without the medium of the air, would burn us up at once, or blind us with effulgence, i. 311, 312.

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mountains in Spitzbergen and Greenland—unable to retreat when attacked with fire-arms, they make a fierce and long resistance—they live upon fish and seals, their flesh is too strong for food—are often seen on ice-floats, several leagues at sea, though bad swimmers—the white sometimes jumps into a Greenlander's boat, and if it does not overset it, sits down calmly, and, like a passenger, suffers itself to be rowed along—hunger makes it swim after fish—often a battle ensues between a bear and a morse, or a whale, and the latter generally prove victorious, iv. 297 to 303.

Beasts are most fierce and cruel in all countries where men are most barbarous, ii. 303.

Beasts of chase, in the reigns of William Rufus, and Henry the First, it was less criminal to destroy one of the human species than a beast of chase—sacred edifices thrown down, and turned to waste, to make room for beasts of chase, iii. 102.

Beasts of prey, seldom devour each other—they chiefly seek after the deer or the goat—their usual method of hunting, ii. 295.

Beaver, known to build like an architect, and rule like a citizen, ii. 301—Its fore parts taste like flesh, and the hinder like the fish it feeds on, iii. 178—A remaining monument of brutal society—its qualities, taken from its fellows, and kept in solitude or domestic tameness—resists only when driven to extremity, and fights when its speed cannot avail—the only quadrupede that has a flat broad tail, covered with scales, serving as a rudder to direct its motions in the water—the sole quadrupede with membranes between the toes on the hind feet, and none on the fore feet—the only animal in its fore parts entirely resembling a quadrupede, and in its hinder parts approaches the nature of fishes, having a scaly tail—its description—has but one vent for the emission of excrements and urine—they assemble about the months of June and July

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—make a society to continue the greatest part of the year—form a company of above two hundred—fix their abode by the side of a lake or river—cut with their teeth a tree thicker than a man's body—amazing works and mansion houses—convey their materials by water—mix clay and dry grass together, work it into a mortar, and with their tails plaister their work within and without—their walls perpendicular, and two feet thick—their piers four-score or an hundred feet long, and ten or twelve feet thick at the base—their dikes ten and twelve feet thick at the foundation—their apartments round, or oval, and divided into three stories, one above the other—visited too often by men, they work only in the night-time, or abandon the place, and seek a safer situation—four hundred reside in one mansion-house, divided into a number of apartments, having communication with each other—their works in the northern parts finished in August or September—in summer they are epicures—their provisions for the winter season—they drive piles into the earth, to fence and fortify their habitation against the wind and water—cut down branches from three to ten feet in length—the largest are conveyed to the magazines by a whole body—the smallest by one only—each taking a different way, and having a walk assigned him, that no one should interrupt another in his work—wood-yards larger or smaller, in proportion to the number in family—manner of catching them in snares, or by surprise—they swim with their mortar on their tails, and their stakes between their teeth—their works damaged by force of water, or feet of huntsmen, instantly repaired, iv. 147 to 156.

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Beds, the earth every where in beds over beds, and each of them maintaining exactly the same thickness, i. 54.

Bee, a ruminating insect, or seemingly so—its stomach is composed of muscular fibres, iii. 6—Operations studied for two thousand years are still incompletely known—Reaumur's account sufficiently wonderful—many of the facts held dubious by those conversant with the subject—some declared not to have existence in nature—three different kinds of bees—common working bees neither male nor female—queen bees lay all the eggs that are hatched in a season—structure of the working bee, particularly of its trunk, which extracts the honey from flowers—manner of building their cells—in one day, they make cells upon each other enough to contain three thousand bees—description of those cells—the combs made by insensible degrees, not at once, as some imagine—the cells for the young and for the drones—that for the queen bee the largest of all—those for honey are deeper than the rest—that not the only food upon which they subsist—manner of anticipating the progress of vegetation—the bee has a stomach for wax as well as honey—bee-bread—treacle for food of bees in winter—what part of the flower has the honey—sting of the bee—any wanting food, bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth—numerous as the multitude of bees appear
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in a swarm, they all owe their origin to one parent, called the queen bee—opening the body of a queen, the eggs at one time found to amount to five thousand—the queen easily distinguished from the rest—great fertility of the queen, and the great attentions paid to her, controverted by recent observers—they leave a cell to every egg, and destroy the rest—great care and affection for the young—in about twenty days after the egg was laid, the bee was completely formed, and fitted to undergo the fatigues of its state—the cell being prepared, the animal soon transformed into an aurelia different from that of the common caterpillar—when they begin to break their prisons, above a hundred are excluded in one day—dreadful battles often ensue between the young brood and their progenitors—signs previous to their migrations—after the migration, the queen being settled, the swarm follows, and in a quarter of an hour the whole body is at ease—sometimes sacrifice their queen; but never when the hive is full of wax and honey—the working sort kill the drones in the worm state, in the cell, and eject their bodies from the hive among the general carnage—upwards of forty thousand bees found in a single hive—instances of expedition in working—in the first fifteen days, they make more wax than during the rest of the year—a hive sending out several swarms in the year, the first always the best and most numerous—a kind of floating bee-house used in France, viii. 5 to 26.

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congeals, is fluid as oil, and has the colour of amber—in the tropical climates are black bees without a sting—their wax is soft, and only used for medicinal purposes, not being hard enough for candles, as in Europe—whether the humble bees have a queen or not, there is one much larger than the rest, without wings, without hair, all over black, like polished ebony—this views all the works, from time to time—their habits—the honey gathered by the humble bees neither so fine, so good, nor the wax so clear, or so capable of fusion, as those of the common bees, viii. 23 to 30.

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of that beetle, which the Americans call the tumble-dung—the insect called king of the beetles—description of the elephant-beetle, the largest of this kind hitherto known, viii. 63 to 73.

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Bell, when the stag cries, he is said to bell, iii. 105.

Bells, their vibrations not heard under the receiver of an air-pump, i. 312.

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Billitting, a name given by huntsmen to the excrement of the fox, iii. 304.

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world—some have horns, some are without—they are equally tractable and gentle when tamed—and are furnished with a fine, lustrous, soft hair, more beautiful than that of our own breed—their hump of different sizes, weighing from forty to fifty pounds, more or less—cuts and tastes somewhat like a dressed udder—the bisons of Malabar, Abyssinia, Madagascar, Arabia, Africa, and America—in the course of a few generations, the hump wears away—its description—the bison and the cow breed among each other—the grunting or Siberian cow, and the little African cow or zebu are different races of the bison, iii. 14 to 30.

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Bittern, or mire-drum, the solemnity of its evening-call cannot be described by words—they are calls to courtship, or of connubial felicity—it differs from the heron chiefly in colour—its windpipe fitted for the sound—opinions concerning the cause of its boomings—never utters its call in domestic captivity—its residence—a retired timorous animal—its food, nest, and eggs—in three days, leads its little ones to their food—differences between the bittern and the heron—its hollow boom considered by the vulgar as the presage of some sad event—instance of it—its flesh greatly esteemed among the luxurious—it seldom rises but when almost trod upon—at the latter end of autumn, in the evening, its wonted indolence forsakes it—is then seen rising in a spiral ascent, till quite lost from the view, making a singular noise different from its former boomings—names given to this bird by the Greeks and Latins, vi. 1 to 5.

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Brush, the name given by huntsmen to the tail of the fox, iii. 304.

Brutes, in those countries where men are most barbarous and stupid, brutes are most active and sagacious, iv. 217.

Buache (Mr.) has given a map of the bottom of the sea between Africa and America, i. 271.

Bubalus, an animal partaking of the mixed natures of the cow, the goat, and the deer—its description—has often been called the Barbary cow, from which it differs widely, iii. 73, *et seq.*

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Buccinums, one or two of them viviparous, vii. 28.

Buck, capable of propagating at the age of one year—
—one buck sufficient for an hundred and fifty goats—
—becomes old before his seventh year, iii. 51—
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Buck-goat produces with the ewe an animal that, in two or three generations, returns to the sheep, retaining no mark of its ancient progenitor, iii. 33.

Buffalo, of the varieties of the cow kind, but two are really distinct, the cow and the buffalo—they bear an antipathy to each other—they do not breed among each other, and no animals are more distinct and like each other less—are in abundance in Guinea and Malabar—it is a great swimmer—description of it—the veal of the young is not better eating than the beef of the old—they are natives of the warmer climates—yet are bred in several parts of Europe, particularly in Italy—the female produces one at a time—continues pregnant for twelve months—is afraid of fire—leather made of its hide is well known for thickness, softness, and impenetrability—guided by a ring thrust through its nose—milk of the female not so good as of the cow—two buffaloes yoked draw more than four strong horses—its flesh hard and blackish, disagreeable to taste and smell—this animal wild in many parts of India, and dangerous—manner of hunting them—when tamed, no animal more patient or humble—inferior in size only to the elephant, the rhinoceros, or hippopotamus—the camelopard, or camel, is taller, neither so long, nor so corpulent—is fond of the water, and crosses the largest rivers without difficulty—has an aversion

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Buffon, (M.) his theory of the earth, and a detail of it—questions that might be asked this most ingenious philosopher concerning his theory of the earth, i. 31 to 36—he has brought together a multitude of facts relative to the history of the earth, 37—his system about the rudiments of animals, ii. 17—objections against it, 18—thinks that women never become bald, 79—his description of the first sensations of a man just brought into existence, pointing out the steps by which he arrived at reality, 172.

Buffoon-bird, name our sailors give the Numidian crane—its peculiar gestures and contortions—the French call it demoiselle—it is a very scarce bird—the ancients have described a buffoon-bird, but not meant the Numidian crane, v. 348, *et seq.*

Bug, the May-bug, viii. 65. See *Beetles*.

Bugs, their habits—described—are often found coupling tail to tail—manner of destroying them—they destroy fleas, and devour each other, vii. 256 to 260.

Bulbous, hair is so at the root, ii. 79.

Bulin, a sea-snail, performs the offices of male and female at the same time, vii. 29.

Bull, the gimerro, asserted to be between the ass and the bull, ii. 354.

Bullfinch, bird of the sparrow kind, v. 280, 281—may be taught to whistle a regular tune, 307.

Bull-head, description of this fish, vi. 281.

Bulls, the wild, in Spain, mean, despicable animals—have nothing of that sternness of aspect remarkable in our bulls, iii. 18.

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Bull's-eye, name given by sailors to a terrible hurricane—described, i. 335.

Bunting, bird of the sparrow kind, v. 280.

Burnet, his theory of the earth—a detail of that work, i. 21, 22.

Bustard, the largest land-bird that is a native of Britain—inhabits the open and extensive plain—is much larger than the turkey, the male generally weighing from twenty-five to twenty-seven pounds—its description—its food—places where frequently seen in flocks of fifty or more—they have always centinels placed at proper eminences, ever on the watch, to warn the flock of the appearance of danger—are often run down by greyhounds—in what manner—seldom wander above twenty or thirty miles from home—the males have a pouch, holding near seven quarts of water—they change their mates at the season of incubation, about the latter end of summer—separate in pairs, if there be a sufficiency of females for the males; otherwise the males fight until one of them falls—in France, some of those victims of gallantry found dead in the fields—their nests—they lay two eggs, almost the size of a goose-egg—hatch for about five weeks—the young run about as soon as out of the shell—they assemble in flocks in October, and keep together till April—their food in winter—in parts of Switzerland, they are found frozen in the fields in severe weather—when taken to a warm place, they again recover—usually live fifteen years, and are incapable of being propagated in a domestic state, v. 173 to 177.

Butcher-bird, its description, with its habits—leads a life of continual combat—intrepidity of this little creature, in going to war with the pie, the crow, and the kestrel, all above four times bigger than itself—it fights upon the defensive, and often comes to the attack with advantage, particularly when the male and female unite to protect their young, and
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to drive away the more powerful birds of rapine—in what manner they fall forth against them—sometimes the combat ends with the destruction of the assailant, and also of the defender—the most redoubtable birds of prey respect them, and they fly in their company without fearing their power, or avoiding their resentment—small birds are its usual food; and when it has killed the bird or insect, as asserted by the best authority, it fixes them upon some neighbouring thorn, and when thus spitted, pulls them to pieces with its bill—the smaller red butcher-bird migrates—the places where they are to be found—their nests, and the number of their eggs—the female feeds her young with caterpillars and other insects, but soon after accustoms them to flesh, procured by the male with great industry—their nature very different from other birds of prey in their parental care; for, instead of driving out their young from the nest to shift for themselves, they keep them with care, and even when adult do not forsake them—the whole brood thus live in a family together—each family afterwards live apart, and hunt in concert—upon the returning season of courtship, this union is at an end, the family parts for ever, each to establish a little household of his own—the manner of flying is always up and down, seldom direct or sideways—different kinds of this bird, v. 119 to 122.

Butter, the fat of the manati serves in all cases instead of butter, iv. 174.

Butterfly, some kinds actually live upon nothing, ii.

114 —one of the principal ornaments of oriental poetry—in those countries, the insect is larger and more beautiful than with us, vii. 337—easily distinguished from flies of every other kind by their wings—Linnæus has reckoned up above seven hundred and sixty different kinds, yet the catalogue is incomplete—number and beautiful colours of its wings—butterflies can discover their mates at more than a mile's distance—description of the head,

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corselet, and body—the eyes have not all the same form; but the outward coat has a lustre, in which may be discovered all the colours of the rainbow—when examined closely, it has the appearance of a multiplying glass—the use of their horns or feelers as yet unknown—use of their trunks—difference between butterflies and moths—they often perceive the approach of the female at above two miles distance; by what sense is not easy to conceive—it has no organs for smelling—the female is larger than the male—if disturbed while united, the female flies off with the male on her back, entirely passive upon the occasion—after junction, they deposite their eggs and die—all females of this tribe are impregnated by the male by one aperture, and lay their eggs by another—every butterfly chuses for her brood, instead of the plant most grateful in its winged state, that it has fed upon in its reptile form—how they keep their eggs warm, and also entirely concealed—many do not lay till the winter warns them of their approaching end—some continue the whole winter in hollows of trees, and do not provide for posterity until the beginning of April, then leave their retreats, deposite their eggs, and die, vii. 363 to 373. See *Aurelia*, 360.

Buttock, in man, different from that of all other animals, ii. 96.

Buzzard, a sluggish inactive bird, often remains perched whole days upon the same bough—lives more upon frogs, mice, and insects, than upon birds more troublesome to seize—its manner of living in summer—so little capable of instruction, that it is a proverb to call one obstinately ignorant, a buzzard—the honey-buzzard, the moor-buzzard, and the hen-harrier, are of this stupid tribe, and differ chiefly in their size, v. 117.

Byron (Commodore) our last voyager that has seen the gigantic race of mankind, ii. 240.

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Cabiai, the same animal as the capibara, iii. 175.

Cachalot, a fish said to pursue a shoal of herrings, and to swallow thousands at a gulp, vi. 151—it has generally gone under the name of the spermaceti whale, till Mr. Pennant made the distinction, borrowing its name from the French—seven distinctions in this tribe—description—the throat of this animal very formidable—with ease it could swallow an ox—it can at one gulp send a shoal of fishes down its enormous gullet—it terrifies the dolphins and porpoises so much, as often to drive them on shore—it contains two precious drugs, spermaceti and ambergrise—the oil of this fish is easily convertible into spermaceti, by boiling it with a ley of pot-ash, and hardening it in the manner of soap—candles are now made of it—the balls of ambergrise not found in all fishes of this kind, but chiefly in the oldest and strongest, 195 to 199.

Cagui, or the faki, is the largest monkey of the sagoin kind—its description, iv. 222.

Cajeta, a mountain near it, was split by an earthquake, i. 145.

Cairo, in what manner they produce there six or seven thousand chickens at a time, v. 151.

Caius, (Dr.) lived in the times of Queen Elizabeth, wrote the Natural History of Dogs, and divides the whole race into three kinds, the generous, the farm-kind, and the mongrel, iii. 264.

Calao, the horned Indian raven, v. 208.

Calcination, all animal substances, when calcined, are the same, vii. 101.

Calf, name given to the young of the hind, or the female of the stag, iii. 100.

Calf, or hind-calf; the stag called so the first year, iii. 104.

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Callitrix, the green monkey of St. Jago, of the ancient continent—its description, iv. 219.

Callyonymus, the dragonet—description of this fish, vi. 278.

Calms attended with deluges of rain—why, and where, i. 335.

Camel, a ruminating animal, iii. 5—camel and dromedary, not two distinct kinds, only a variety of the same, which has subsisted time immemorial—the only sensible difference between those two races, they produce with each other, and the mixed breed is considered the best—of the two the dromedary is far the most numerous—countries where the camel and dromedary are found—neither can subsist, or propagate, in the climates towards the North—Arabia the most adapted to the support and production of this animal—the camel the most temperate of all animals—it can continue to travel several days without drinking, and is often six or seven days without any sustenance—its feet formed to travel upon sand, and utterly unfit for moist or marshy places—many vain efforts tried to propagate the camel in Spain—they have been transported into America, but have multiplied in neither—they might perhaps produce in these countries, but would in a few years degenerate; their strength and their patience would forsake them; and, instead of enriching, become a burthen to their keepers—uses to which this animal is put among the Arabians—its education—it has a fifth stomach, as a reservoir, to hold a greater quantity of water than immediately wanted—when the camel finds itself pressed with thirst, it throws up a quantity of this water, by a simple contraction of the muscles, into the other stomachs—travellers, when straightened for water, have often killed their camels for what they expected to find within them—countries where commerce is carried on by means of camels—trading journies in caravans—their food—pursue their way when the guides are utterly astray—its patience and

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and docility when loaded—in what manner the female receives the male—one male left to wait on ten females, the rest castrated—they live from forty to fifty years—every part of this animal converted to some useful purpose—its very excrements are not useless—their burthen, iv. 280 to 289.

Cameleon, its dimensions and appetites—has a power of driving the air it breathes over every part of the body—changes of its colour—it is an error that it assumes the colour of the object it approaches—description of it by Le Bruyn—it often moves one eye, when the other is at rest—sometimes one eye seems to look directly forward, while the other looks backward; and one looks upward, while the other regards the earth, vii. 137 to 142.

Camelopard described—dimensions of a young one—inhabits the deserts of Africa—no animal, from its disposition, or its formation, less fitted for a state of natural hostility—it lives entirely upon vegetables, and when grazing, spreads its fore legs wide to reach the pasture—known to the ancients, but rarely seen in Europe—often seen tame at Grand Cairo, in Egypt—Pompey exhibited at one time ten upon the theatre, iv. 277 to 279.

Camerarius, his description of the perfections a horse ought to possess, ii. 342.

Camlet made of the hair of animals about Angora, iii. 54.

Canada, above thirty thousand martins skins annually imported from that country into England, iii. 345.

Canals for the circulation of blood through the bones, are of different capacities, during the different stages of life, ii. 179, 180—canal of communication through which the blood circulates in the foetus, without going through the lungs, found open in some bodies when dissected, vii. 54.

Canary-bird, taught to pick up the letters of the alphabet at the word of command, to spell any person's name in company, v. 38—by the name,

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originally from the Canary Islands—come to us from Germany, where they are bred in numbers—at what period brought into Europe is not known—about a century ago they were sold at very high prices, and kept only for the amusement of the great—in its native islands it is of a dusky grey colour, and so different from those seen in Europe, as to raise a doubt about its species—rules and instructions for breeding them in a domestic state—apparatus for breeding it in Germany—food the old ones must be supplied with, when the young ones are excluded—so prolific are these birds sometimes, that the female will be ready to hatch a second brood, before the first is able to quit the nest—this bird kept in company with the linnet or gold-finch, pairs, and produces a mixed breed, most like the canary-bird, and resembling it in its song, v. 302 to 307.

Canary boar described, iii. 182.

Cancerous breasts cured by the sucking of the rubeth, or the land-toad, vii. 93.

Candle quickly extinguished in an exhausted receiver, and why, i. 311.

Canzons filled with water, and left to freeze, burst, i. 166.

Cantharis, well known in the shops by the name of Spanish flies, and for their use in blisters—their description, with the differences from each other—the countries where, and trees on which they are seen—it is reported, that the country people expect the return of these insects every seven years—their bad smell is a guide to those who catch them—they smell so disagreeable, as to be perceived at a great distance, especially about sun-set, though not seen at that time—they yield a deal of volatile caustic salt—their qualities—the effects fall principally upon the urinary passages—in what manner they are killed, viii. 75 to 77.

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Cape de Verde islands—a south wind prevails in them during the month of July, i. 323.

Cape of Good Hope, a north-west wind blows there during the month of September, i. 323—customary to hunt the elephant for its teeth—in what manner—account of an unhappy huntsman, iv. 262.

Capibara, or *cabiai*, an animal resembling an hog of about two years old—its description—some naturalists have called it the water-hog; and why—a native of South America, and chiefly frequenting the borders of lakes and rivers—like the otter it seizes the fish, upon which it preys, with its hoofs and teeth—lives also upon fruits, corn, and sugar-canes—its cry resembles the braying of an ass, more than the grunting of a hog—its only place of safety is the water, into which it plunges when pursued; and keeps so long at the bottom, that the hunter can have no hopes of taking it there—when young is easily tamed—its flesh has a fishy taste, but its head is said to be excellent, iii. 175 to 178.

Capon of Pharaoh supposed the true ibis—is a devourer of serpents, and follows the caravans that go to Mecca, to feed upon the offal of the animals killed on the journey, v. 343.

Capons taught to clutch a fresh brood of chickens throughout the year, v. 151.

Caracal, or the syagush, a native of the East Indies, resembles the lynx in size, iii. 239.

Caracol, a town situated at the foot of the Andes, i. 136.

Caraguata, a plant in the West Indies, which clings round the tree it happens to be near—it keeps away that nourishment designed to feed the trunk, and at last entirely destroys its supporter, ii. 4.

Carapo, the gymnotus, description of this fish, vi. 282.

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Carassia, a volcano in South America, i. 92.

Caravan, a single lion of the desert often attacks an entire caravan, iii. 200—the assemblage called a caravan sometimes composed of numbers amounting to ten thousand, iv. 285.

Carcajou, name given by the North Americans to the glutton—its manner of killing the rein-deer, iii. 157.

Caribou, name the Americans give the rein-deer, iii. 142, 157.

Carli (Father) his account of the faithful services of monkies in Angola, where he went to convert the savage natives to Christianity, iv. 216.

Carnivorous animals seek their food in gloomy solitude, iii. 1—they are sharper than the ruminating animals, and why—their stomachs small, and their intestines short, 2—their intestines thin and lean, 4—except the dog, none will make a voluntary attack, but with the odds on their side, ii. 293—in proportion as each wants strength, it uses the assistance of patience, assiduity, and cunning, 294—all animals of this kind pursue in a pack, and encourage each other by their mutual cries, 296—support a state of famine for several weeks together, 297—milk in those animals is more sparing than in others, 310, & iii. 339.

Carnivorous birds seek for such as are of the size most approaching their own, v. 74. See *Birds*.

Carp, an experiment made with this fish in a large vase of water, under an air-pump, vi. 152—one found by Buffon not less than a hundred years old—this discovery confirmed by other authors, 159—continues in the egg not above three weeks, 163—Mr. Tull famous for his invention of spaying carp to give it a fine flavour, 165—its description, 285—the method of fattening it in a damp cellar—it has been known thus to live for a fortnight, to grow exceedingly fat, and to get a superior flavour, 291.

Carriers,

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Carriers, pigeons used to carry letters, v. 257.

Carriion-crow resembles the raven in its appetites, its laying, and manner of bringing up its young, v. 203.

Cartesius, his theory of the winds, not so absurd as Lyfter's, i. 319.

Carthageria, in America—the heat of the climate affects the speech of its inhabitants, which is soft and slow, and their words generally broken—more than three parts of our army destroyed by the climate, in our unsuccessful attack upon it, i. 301.

Carthamus, or bastard saffron, strongly purgative to man—parrots very fond of it, v. 248.

Cartilage, the thyroid cartilage, ii. 93—cartilages in youth elastic, and pliant in age, become at last hard and bony; and why, 180.

Cartilaginous fishes—their general conformation—supposed they grow larger every day till they die—their internal structure—are possessed of a two-fold power of breathing—apertures by which they breathe—the cartilaginous shark, or ray, live some hours after they are taken—fishes of this tribe can remain under water, without taking breath; and can venture their heads above the deep, and continue for hours out of their native element—the season and manner of copulating—and of bringing forth—little difference between the viviparous and the oviparous kinds, in this class of fishes—five divisions of the cartilaginous fish, vi. 209 to 214.

Cassowary, a bird first brought into Europe by the Dutch from Java, in the East Indies, where only it is found—its description—the part which most distinguishes this animal is the head, which inspires some degree of terror—its internal parts described—it has the head of a warrior, the eye of a lion, the defence of a porcupine, and the swiftness of a courser—is not fierce in its natural character—how it defends itself—extraordinary manner of going—the Dutch assert that it can devour glass, iron, and stones.

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stones, and even live and burning coals, without the smallest fear, or the least injury—the largest of its eggs is fifteen inches round one way, and twelve the other—places where this animal is found—it has not multiplied in any considerable degree, as a king of Java made a present of one to the captain of a Dutch ship, as a rarity, v. 62 to 69.

Catacombs of Egypt, ii. 255.

Catamountain, hunts for the hare or the rabbit, ii. 294—the ocelot of Mr. Buffon—its description, iii. 237—is one of the fiercest, and, for its size, one of the most destructive animals in the world, 243.

Catanea, a city utterly overthrown by an earthquake, i. 103.

Cataphraetus, or kabassou, is one of the largest kinds of the armadilla, iv. 124.

Cataract of the eye; Mr. Cheselden having couched a boy of thirteen, who to that time had been blind, and at once having restored him to sight, curiously marked the progress of his mind upon the occasion, ii. 140.

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weight of leaves in a day, and seems no way disordered by the meal—the body of the caterpillar anatomically considered—avidity with which they feed—number of their stigmata, or those holes through which the animal is supposed to breathe—it has eighteen lungs—the experiment of Malpighi to ascertain their use—all caterpillars spin at one time or another—many of them change their skins five or six times in a season—and in what manner—change into an aurelia—their retreats in that state, vii. 337 to 356—there are thousands of fishes, birds, and insects, that live chiefly upon caterpillars—a single sparrow and its mate, that have young ones, destroy above three thousand caterpillars in a week—some of the kind, fitted only to live upon leaves and plants, will eat each other, in preference to their vegetable food—the bodies of the larger kinds serve as a nest to various flies, that very carefully deposite their eggs in them—number of worms remain within the body of the caterpillar, devouring its entrails, without destroying its life—the ichneumon tribe is not the caterpillar's offspring, as supposed, but its murderers, 373 to 378.

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Cats, the wild, hunt for the squirrel or the mouse, ii. 294—the whole tribe seek their food alone, and never unite for mutual defence, nor for mutual support—and, except at certain seasons, are enemies to each other—all of the cat kind devour nothing but flesh, and starve upon any other provision—their greatest force lies in the claws—the cat goes with young fifty-six days, and seldom brings forth above five or six at a time—the male often devours the kittens—before they are a year old, they are fit to engender—the female seeks the male with cries; nor is their copulation performed without great pain, and why—cats hunt the serpents in the isle of Cyprus—any animal weaker than themselves, is to them an indiscriminate object of destruction—the

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stones, and even live and burning coals, without the smallest fear, or the least injury—the largest of its eggs is fifteen inches round one way, and twelve the other—places where this animal is found—it has not multiplied in any considerable degree, as a king of Java made a present of one to the captain of a Dutch ship, as a rarity, v. 62 to 69.

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—the mouse is their favourite game, and they patiently watch a whole day, until the mouse appears—a flagrant mark by which the cat discovers its natural malignity—their eyes see better in darkness than light, and why—if the inhabitant quits the house, the cat still remains—is excessively fond of some plants, such as valerian, marum, and cat-mint—particularly loves fish—its sleep is very light—its hair sends forth shining sparks, if rubbed in the dark—the wild breed with the tame—description of the wild cat—inhabits the most mountainous and woody parts, lives mostly in trees, and feeds only by night—the cat was much higher in esteem among our ancestors than it is at present—laws of Howel, concerning the price of cats—cats were not naturally bred in our forests—of all quadrupedes, the wild cat is, perhaps, that whose intestines are proportionably the smallest and the shortest; and why—common to the new continent, as well as the old—the blue-cat—the lion-cat, or, more properly, the cat of Angora—the cats in Syria and Persia remarkable for their long soft hair, iii. 183 to 196—
—all the cat kind are kept off by the fires which the inhabitants light to preserve their herds and flocks—and they hunt rather by the sight than the smell—it happens that the lion pursues the jackal or the wild dog, while they are hunting upon the scent, and merely for themselves; the lion is then an unwelcome intruder upon the fruits of their toil—from thence, probably, has arisen the story of the lion's provider—the lion devours a great deal at a time, and generally fills himself for two or three days to come—in the deserts and forests, his most usual prey are the gazelles and the monkeys, 206, 207—the race of cats noxious in proportion to their power to do mischief—inhabit the most torrid latitudes of India, Africa, and America, and have never been able to multiply beyond the torrid zone—they seldom attack man, though provoked—of all animals these are the most sullen, and, to a proverb, untameable, 240—different classes of the kind,

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Caverns, the amazing cavern of Eldenhole in Derbyshire—the dreadful cavern in the country of the Arrian Indians, called the Gulph of Pluto, described by Ælian—cavern of Maëstricht—its description—no part of the world has a greater number of artificial caverns than Spain—in general deserted by every race of meaner animals, except the bat—the caverns called Oakley-hole, the Devil's-hole, and Penpark-hole, in England—the cavern of Antiparos, and its discovery, i. 56 to 62—how natural caverns formed, 67—two hundred feet as much as the lowest of them is found to sink, 68—one in Africa, near Fez, continually sends forth either smoke or flames, 92.

Caviar, the inhabitants of Norway prepare from eggs found in the body of the porpessie, a savoury liquor, which makes a delicate sauce, and is good when eaten with bread, vi. 205—it is made with the roe of sturgeon—more in request in other countries of Europe than with us—and is a considerable merchandize among the Turks, Greeks, and Venetians—manner of making it, 254.

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- Causes*, the investigation of final causes a barren study; and, like a virgin dedicated to the deity, brings forth nothing, i. 19.
- Caustic*, cantharides yield a great deal of volatile caustic salt, viii. 77.
- Cayman*, a sort of crocodile, vii. 108.
- Cayopolin*, a kind of opossum—its description, iv. 232.
- Cea*, an island washed away with several thousand inhabitants, i. 124.
- Cells* made by the bees, viii. 10.
- Centere*, a mount of recent appearance, i. 151.
- Centinel*, some animals carefully avoid their enemies, by placing sentries to warn of danger, and know how to punish such as neglect their post, or are unmindful of the common safety, ii. 298—when the marmouts venture abroad, one is placed as a sentry, upon a lofty rock, iv. 41—the bustards have centinels placed upon proper eminences, where always on the watch, they warn the flock of the smallest appearance of danger, v. 174—the flamingo does the same, vi. 12.
- Centipes*, the scolopendra, vii. 274.
- Centriscus*, a kind of cartilaginous fish, vi. 264.
- Cephus*, name given by the ancients to the monkey now called mona, iv. 219.
- Cepola*, the description of this fish, vi. 279.
- Cerigo*, an island of the Archipelago, where many wild asses are found, ii. 346.
- Cetaceous fishes*, the whale and its varieties resemble quadrupedes in their internal structure, and in some of their appetites and affections—they are constrained every two or three minutes to come up to the surface to take breath, as well as to spout out through their nostril (for they have but one) that water which they sucked in while gaping for their prey—the senses of these animals superior to those of other fishes, and it is most likely that all animals
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of the kind can hear—they never produce above one young, or two at the most; and this the female suckles in the manner of quadrupedes, her breasts being placed, as in the human kind, above the navel—distinctive marks of this tribe, vi. 167 to 172.

Chace, men of every age and nation have made that of the stag a favourite pursuit—in our country it was ever esteemed a principal diversion of the great, iii. 100—these sports reserved by sovereigns for particular amusement, and when—in the reigns of William Rufus and Henry the First, it was less criminal to destroy a human being than a beast of chace—sacred edifices thrown down for room to beasts of chace, 102—chace of the stag, as performed in England, 103, 107—terms used by hunters in that chace, 104—the same in Sicily, 111—and in China, 112—chace of the fox—cant terms used by the huntsmen in it, 304—of all varieties, that of the ostrich the most laborious, is also the most entertaining—description of it, v. 55.

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Charles XII. when shot at the siege of Fredericshall, was seen to clap his hand on the hilt of his sword, ii. 192.

Charoffi, the only sort of horses for hunting lions, iii. 210.

Charybdis, a gulph—Nicola Pesce jumped into it, continued for three quarters of an hour below, and at last appeared holding a golden cup in one hand, and making his way among the waves with the other—description of this gulph, i. 276, 277.

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Chatodon, or the *cat-fish*, its description, vi. 280.

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Cheese, the inhabitants of Canada use no other than the milk of the hind, or the female of the stag, iii 114—those of Lapland little and well tasted—never breed mites, 153.

Cheney, suspected the quantity of water on the earth daily decreasing, i. 169.

Cheops, the oldest measure of the human figure in his monument, in the first pyramid of Egypt, ii. 243.

Chefelden, after couching a boy of thirteen for a cata-ract, blind from his infancy, and at once restoring him to sight, curiously marked the progress of his mind upon the occasion, ii. 140.

Chevrotin, or little *Guinea deer*, the least of all cloven-footed quadrupedes, and perhaps the most beautiful—is most delicately shaped—its description—native of India, Guinea, and the warm climates between the tropics—the male in Guinea has horns; but the female is without any—they chiefly abound in Java and Ceylon, iii. 76. *et seq.*

Chicken, an amazing history of it in the egg, by Malphigi and Haller, ii. 25, *et seq.*—in what manner six or seven thousand are produced at a time, at Grand Cairo—capons clutch a fresh brood of chickens throughout the year, v. 151.

Child, history of the child in the womb, ii. 36—children of negroes able to walk at two months old; at least to move from one place to another—skin of children newly brought forth, is always red, and why—the size of a new-born infant about twenty inches, and its weight twelve pounds, 51—in cold countries continue to be suckled for four or five years together, 54—child's growth less every year, till the time of puberty, when it seems to start up of a sudden, 56—in some countries speak sooner

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Chinese, have neither flats nor sharps in their music, ii. 153—their horses weak, little, ill-shaped, and cowardly, 334—description of that people, 204.

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Chrysalis, or the *aurelia*, vii. 352.

Chryses, an island sunk near Lemnos, i. 124.

Cicero, a long poem of his in praise of the halcyon, of which but two lines remain, vi. 129.

Circassians, described, ii. 212.

Circe, an enchantress, armed her son with a spear headed with the spine of the trygon, vi. 235.

Circulation of the blood through the bones, first accidentally discovered by Mr. Belcher—experiment made by him for this purpose—canals for circulation of the blood through the bones, of different capacities in the various stages of life, ii. 179—circulation through all parts of the body, 180.

Civet, the species distinguished into two kinds; Mr. Buffon

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Buffon calls one the civet, the other the zibet—distinction between the two kinds—the civet thirty inches long—both civet and zibet considered as varieties of the same animal, as former naturalists have done—the civet resembles the weasel kind, in what—differs from them, in what—the opening of the pouch, or bag, the receptacle of the civet—manner of taking the civet from the pouch—although a native of the warmest climates, this animal lives in temperate, and even cold countries—kinds of food it likes best—drinks rarely, yet makes urine often; and, upon such occasions, the male is not distinguished from the female—numbers of these animals bred in Holland, and the perfume of Amsterdam reckoned the purest of any—the quantity greater proportionably to the quality and abundance of the food—this perfume so strong, that it communicates to all parts of the animal's body—to its fur and skin—manner of choosing the perfume—the places of considerable traffic in it—the animal irritated, its scent becomes greater; and tormented, its sweat is still stronger, and serves to adulterate or increase what otherwise obtained from it—civet a more grateful perfume than musk—sold in Holland for fifty shillings an ounce—its eyes shine in the night—sees better in the dark than by day—breeds very fast in climates where heat conduces to propagation—thought a wild fierce animal, never thoroughly familiar—lives by prey, birds, and animals it can overcome—its claws feeble and inflexible—this perfume quite discontinued in prescription, iii. 360 to 366.

Clavicles, or collar bones, what animals have them—Mr. Buffon says, none but monkeys—this is an oversight, ii. 94.

Claws of the lion give a false idea of its power; we ascribe to its force the effects of its arms, ii. 102—the weasel kind neither draw in, nor extend their claws, as cats do, iii. 320—those of the civet feeble and inflexible, 365.

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- Cloth*, now made worse than some years past, iii. 41—Flemings possessed the art of cloth-working in a superior degree, 40.
- Clowe-trees*, cut down by the Dutch at Ternate to raise the price of the spice—soon had reason to repent of their avarice, i. 303.
- Clouds*, the fore-runners of a terrible hurricane, called by sailors the bull's eye, i. 335—dashing against each other, produces electrical fire—water evaporates, and rising forms clouds—theory upon it—that of Dr. Hamilton—the author's theory of evaporation, 343 to 345—at once pour down their contents, and produce a deluge—reflecting back images of things on earth, like mirrors, 352.
- Clupea*, or *herring*, its description, vi. 285.
- Coaiti*, a monkey of the new continent, described, iv. 221.
- Coan*, the name of a dwarf lately dead at Chelsea, ii. 233.
- Coast* of Italy is bordered with rocks of marble of different kinds—those of France, from Brest to Bourdeaux, also Spain and England, composed of rocks, i. 253—of the sea, have peculiar winds, 325, *et seq.*—deadly winds all along those of the Persian Gulph, and those of India, 335.
- Coatimondi*, extreme length of its snout—its description—very subject to eat its own tail—its habits, iv. 309, *et seq.*

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Cobitis, the loach, description of this fish, vi. 236.

Cobra di Capello, a kind of serpent, vii. 176, 184, 198.

Cochineal, description of this insect as in our shops brought from America—difference between the domestic and wild cochineal—precautions used by those who take care of these insects—the propagator has a new harvest thrice a year—various methods of killing them produce different colours as brought to us—our cochineal is only the females—used both for dyeing and medicine, viii. 78 to 81.

Cock, of all birds the cock the oldest companion of man, and first reclaimed from the forest—species of cock from Japan, covered over with hair instead of feathers—the western world had the cock from Persia—Aristophanes's cock the Persian bird—it was one of the forbidden foods among the ancient Britons—Persia, that first introduced it to us, no longer knows it in its natural form—countries where it is wild—peculiarities, in a wild condition—another peculiarity in those of the Indian woods, their bones, when boiled, are black as ebony—the Athenians had cock-matches as we—no animal of greater courage, when opposed to his own species—in China, India, the Philippine Islands, and over the East, cock fighting the sport and amusement of kings and princes—cocks in China as bold, or bolder, than ours—and of more strength with less weight—its great courage proceeds from being the most fallacious of all birds—a single cock suffices for a dozen hens; and is the only animal whose spirits are not abated by indulgence—soon grows old; and in three or four years becomes unfit for purposes of impregnation—how long cocks live, left to themselves, not well ascertained—Aldrovandus makes their age to be ten years—are injured, as Linnæus asserts, by elder-berries, v. 143 to 153—the black chiefly found in heathy mountains and piny forests, v. 177—cock of the wood. See *Wood-cock*.

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- Cockle*, a bivalved shell-fish, vii. 47.
- Coco*, the elephant eats the plant to the roots, iv. 242.
- Cod*, from the banks of Newfoundland, pursues the whiting, which flies before it to the southern shores of Spain, vi. 151—spawns in one season, as Lewenhoeck asserts, above nine millions of eggs or peas, contained in a single roe, 161—its description, 283—fishery in Newfoundland, 295.
- Colchis*, in Asia Minor. See *Pheasants*.
- Cold*, promotes evaporation, although diminishing the force of menstruums, i. 345—extremity of it not less productive of tawny complexions than that of heat, ii. 218—excessive, preserves bodies from corruption, 252—some fishes rendered so torpid by cold, in northern rivers, as to be frozen up in the masses of ice, where they continue for months together, without life or sensation, prisoners of congelation, waiting a warmer sun to restore them to life and liberty, vi. 316.
- Collar-bones*, what animals have them, ii. 94.
- Colliers*, eight dropped down dead by the vapour of the mines in Scotland, as if shot, i. 75.
- Colour*, none refreshes the sight so well as green, i. 15—different of the waters of the same sea, 256—of the sea, not from any thing floating in it, but from different reflexions of rays of light, 272—of the blood in the arteries or veins, 310—different colours of the eye, ii. 75—whence proceeds the tawny of North-American Indians, 217—hair takes its colour from juices flowing through it, 80—that of the object contributes to form an idea of the distance at which it appears, 144—of all those by which mankind is diversified, ours most beautiful to the eye, and most advantageous, 213—those changes the African, the Asiatic, or the American undergo, in their colour, are but accidental deformities, which might probably be removed, 222—nothing exceeds the delicate regularity of those of the zebra, 357—

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Comets, their number much greater than that of the planets—they roll in orbits—experience has not sufficiently confirmed the truth of the investigation about their returning periods, i. 5.

Complexion, extremity of cold not less productive of a twany than that of heat—not easy to conceive how the sun whitens wax and linen, and darkens the human complexion—the sun not the only cause of darkening it, ii. 217.

Comte's (Le) account of an ape he saw in the streights of Molucca, iv. 185.

Concretions, scarce an animal, or a part of their bodies, in which concretions are not formed—experience has found but few cures by the efficacy of these concretions—often prove fatal to the animal that bears them, iii. 71, *et. seq.*

Condamine (La) describes a fish possessed of the powers of the torpedo, every way resembling a lamprey, vi. 242.

Condoma, anomalous animal of the goat kind—its description, iii. 75.

Condor, possesses, in a higher degree than the eagle, all the qualities that render it formidable to the feathered kind, to beasts, and to man himself—is eighteen feet across the wings extended, according to Acosta, Jarcilasso, and Desmarchais—the beak so strong as to pierce the body of a cow; two of them able to devour it—they do not abstain from man himself—fortunately there are few of the species—the Indians believe that they will carry off a deer, or a young calf, in their talons, as eagles would a hare or a rabbit; and that their sight is piercing, and their air terrible; that they seldom frequent the forests, as they require a large space for the display of their wings—they come down to the sea shore at certain seasons, when their prey fails upon land, they then feed

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- feed upon dead fish, and such nutritious substances as are thrown upon the shore—their countenance not so terrible as old writers have represented—those who have seen this animal, say the body is as large as that of a sheep—many instances of its carrying away children—circumstantial account of this bird by P. Feuillée, the only traveller who has accurately described it—countries where it is found—in the deserts of Pachomac, where it is chiefly, men seldom venture to travel—its flesh as disagreeable as carrion, v. 90 to 95.
- Conepate*, an animal resembling the skink in all things except size, iii. 353.
- Congar* of America, resembles the tiger in natural ferocity, though far inferior in its dimensions, iv. 305.
- Congelation*, the heat of blood in man and other animals is about thirty degrees above congelation; but in the marmout and other animals which seem to sleep the winter, the heat of the blood is not above ten degrees above congelation, iv. 43.
- Congo*, the land and sea breezes there, i. 328—the inhabitants of, desire ardently to prostitute their wives and daughters to strangers, ii. 68.
- Constantinople*, its cats—name given to the genetts, and why, iii. 359.
- Continent* of America—that part under the line is cool and pleasant, ii. 215.
- Coot*, description of that bird—residence and nest—sometimes swims down the current, till it reaches the sea—dangers encountered in this voyage, vi. 33 to 36.
- Copel*, manner of making that vessel, i. 154.
- Copulation*, natural instinct for the proper times—instances of it, ii. 310—gnats produce young without copulation, viii. 88.
- Coquallin*, the Brasilian squirrel, so called by Buffon, iv. 25.

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- Coral*, the common red never met with in the fossil world, i. 43.
- Coral-serpent*, described, vii. 198.
- Coral-plants*, their various appearances—opinion of count Marfigli upon corals—Mr. Ellis proves it the work of reptiles of the polypus kind—principal experiment to this purpose, viii. 121 to 125.
- Coralines*, called *fungi madreporæ*, viii. 126.
- Cordyle*, the tockay and the tejuguacu fill up the chasm between the crocodile and the African iguana, vii. 136.
- Coret*, a sea-snail, performs the offices of male and female at the same time, vii. 29.
- Coriander* used in dressing a hare in the true Roman taste, iv. 14.
- Corin*, name of the third variety of gazelles, by Mr. Buffon, iii. 68.
- Cormorant*, its description and food—remarkably voracious, with a sudden digestion—its form disagreeable—its voice hoarse and croaking—all its qualities obscene—no wonder Milton makes Satan personate this bird—objection against this passage of Milton's *Paradise Lost*, vindicated—fishes in fresh waters, and in the depths of the ocean—builds in cliffs of rocks, and in trees—preys in the day-time, and by night—once used in England for fishing, and in what manner—how educated in China, for the purposes of fishing—the best fisher of all birds—sometimes has caught the fish by the tail—the fins prevent its being swallowed in that position—how it manages the fish in this case, vi. 58 to 63—remarked for the quickness of its sight, 67.
- Corn*, the flying squirrel is apt to do a great deal of damage in the corn-fields, iv. 35.
- Cornaro* lived an hundred years, with a constitution naturally feeble, ii. 185.
- Cornea* of a flea. See *Flea* and *Flies*.

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Cornwall, pilchards make that coast a place of resort, vi. 302.

Coromandel, dreadful tempests wholly unknown along its coasts, i. 324—amazing size of oysters along that coast, vii. 47.

Corrira, or the runner, a bird of the crane kind—its description, vi. 19.

Corruption, excessive cold preserves bodies from it—and a great degree of dryness produced by heat—earth, if drying and astringent, produces the same effect—bodies never corrupt at Spitsbergen, though buried for thirty years—men and animals buried in the sands of Arabia, preserved from corruption for ages, as if actually embalmed—bodies buried in the monastery of the Cordeliers at Thoulouse, preserved from corruption—bodies previously embalmed, buried in the sands of Chorosan, in Persia, preserved from corruption for a thousand years, ii. 252 to 254—amazing preservation from it, in a mummy lately dug up in France, 260.

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form with inflexible perseverance—the cows suit themselves to the appetites and conveniencies of mankind—no animal has a greater variety of kinds, none more humble and pliant—the cow and bison breed among each other—the cow does not breed with the buffalo—no animals more distinct, or have stronger antipathies to each other—the cow goes nine months with young—the grunting, or Siberian cow, and the little African, or zebu, are different races of the bison—animals of the cow kind, by naturalists extended to eight or ten sorts, reduced to two—an animal of the cow kind, by no naturalist described—the description of it, iii. 14 to 31—the Greeks compared the eyes of a beautiful woman to those of a cow, 67—it eats two hundred and seventy-six plants, and rejects two hundred and eighteen, 163.

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—this bird somewhat less than a pigeon, shaped like a magpie, and of a greyish colour—is distinguished from all other by its round prominent nostrils—discovers itself in our country early in the spring, by its well-known call—its note heard earlier or later, as the season is more or less forward, and the weather inviting—from the chearful voice of this bird, the farmer instructed in the real advancement of the year—history and nature of this bird still in great obscurity—its call an invitation to courtship, used only by the male, generally perched upon a dead tree, or bare bough, repeating his song, which he loses when the genial season is over—his note pleasant, though uniform—the female makes no nest—repairs to the nest of some other bird, generally the water-wag-tail or hedge-sparrow, and, after devouring the eggs of the owner, lays hers in their place—usually lays but one—this the little foolish bird hatches with great assiduity, and when excluded, fondly thinks the great ill-looking changeling her own—to supply this voracious creature, the credulous nurse toils with unwearied labour, not sensible she is feeding up an enemy to her race—the stomach of this bird is enormous, and reaches from the breast-bone to the vent—its food—naturally weak and fearful—the smaller birds form a train of pursuers; the wry-neck, in particular, the most active in the chase—supposed, in winter, to lie hid in hollow trees, or to pass into warmer climates—story of a cuckoo found in a willow log, in winter—probable opinion concerning its residence in winter—Briffon makes not less than twenty-eight sorts of this bird; and talks of one of Brasil, as making a horrible noise in the forests, v. 232 to 237—follows a very different trade from what its nurse endeavoured to teach it; and, according to Pliny, in time destroys its instructor, vi. 114.

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able subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of food—eagles killed a peasant who had robbed their nests—there is a law in the Orkney islands, which entitles any person that kills an eagle to a hen out of every house in the parish in which the plunderer is killed—the nest of the eagle is usually built in the most inaccessible cliff of the rock—description of one found in the Peak of Derbyshire—it hatches its eggs for thirty days—very rare to find three eaglets in the same nest; and it is asserted, that the mother kills the most feeble, or the most voracious—it is believed they live above an hundred years, and that they die, not of old age, but from the beaks turning inward upon the under jaw, and preventing their taking any food—an eagle endured hunger for twenty-one days, without any sustenance whatever—they are first white, then inclining to yellow, and at last light brown—age, hunger, captivity, and diseases, make them whiter—those kept tame are fed with every kind of flesh, fresh or corrupting; and upon a deficiency of that, bread, or any other provision, will suffice—it is dangerous approaching them, if not quite tame; and they sometimes send forth a loud, piercing, lamentable cry, which renders them still more formidable—they drink but seldom, and perhaps, when at liberty, not at all—the bald eagle an inhabitant of North Carolina—breeds in that country all the year round—manner in which the eggs are hatched—characteristics and habitudes of this animal—its nest is large enough to fill the body of a cart, and commonly full of bones half eaten, and putrid flesh, the stench of which is intolerable, v. 78 to 87.

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confusedly represent the original—general observa-
tions about its conformation—of all quadrupedes,
the elephant the strongest, and largest; yet neither
fierce,

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fierce, nor formidable—in its native deserts seldom alone, being a social, friendly creature—the oldest conducts the band; the next in seniority brings up the rear—order maintained in dangerous marches—never so far asunder as to be incapable of reciprocal assistance—their invasions the more disagreeable, there being no means of repelling them; since an attempt to molest a drove would certainly be fatal—manner of going against him who offers the insult—do no personal injury when suffered to feed uninterrupted—molested by man, they seek all occasions to be revenged—where they like best to live in their natural state—cannot live far from water; and always disturb it before they drink—often fill their trunk with water, to cool it, or by way of play to spurt it out like a fountain—equally distressed by the extremes of heat and cold—swim from the continent into islands some leagues distant—frequently migrate from one country to another, and why—their food of the vegetable kind, loathing all sort of animal diet—one finding a spot of good pasture, invites the rest to partake of it—precautions by negroes and Indians against them—they often break through their fence, destroy the harvest, overturn their habitations, and then retreat in order, as they made the irruption—looks with attention and friendship at its master—its ears wipe its eyes, and cover them against the dust and flies—it likes music, learns to beat time, move in measure, and join its voice to the sound of the drum and trumpet—is pleased with the odours that delight man—the orange flower particularly grateful to its taste and smell—picks up flowers, and is pleased with the scent—seeks the most odoriferous plants for food—prefers the coco, the banana, the palm, and the sago tree to all others—eats plants to the roots—their sense of touching most delicate—description of its trunk—serving all the purposes of a hand—breathes, drinks, and smells through the trunk—takes a pin from the ground, unties knots of a rope, unlocks a door, and writes with a pen, iv.

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size—the largest kept for princes—their colour—that appropriated for the monarch's own riding, kept in a palace, attended by nobles, and almost adored by the people—opinions concerning the white elephant—the eastern princes maintain as many elephants as they are able, and place great confidence on their assistance in an engagement—they never breed in a state of servitude, and the generative powers fail when it comes under the dominion of man—duration of pregnancy in the female still a secret—what Aristotle and others say concerning this and their young is doubtful—method of taking them wild in the woods—negroes of Africa, who hunt this animal for its flesh, take it in pit-falls—its attachment to the person that attends it—it comprehends several of the signs made to it, distinguishes the tone of command from that of anger or approbation, and acts accordingly—executing orders with prudence, eagerly, yet without precipitation—is taught to kneel down, to receive its rider, usually mounted upon its neck—caresses those it knows, salutes such as ordered to distinguish, and helps to take up part of its load—takes a pleasure in the finery of its trappings—draws chariots, cannon, or shipping, with strength and perseverance; and satisfaction, provided it be not corrected without a cause, and that its master be pleased with its exertions—in what manner the conductor guides it—frequently takes such an affection to its keeper, as to obey no other—has been known to die of grief for killing its conductor in a fit of madness—surprising instance of moderation in its fury—a word sufficient to put it into motion, 250 to 257—a century or two ago, the Indian generals made great dependence upon the number and the expertness of their elephants—of late they are little used, except for drawing cannon, and transporting provisions—still they are used in war in Siam, in Cochinchina, in Tonquin, and Pegu—in what manner armed and led to battle—effects of its fury in the field—those placed upon its back in a square tower,

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tower, combat as from an eminence, and fling down their weapons with double force—nothing more dreadful, or more irresistible, than such moving machines, to men unacquainted with the modern arts of war—Romans quickly learned the art of opening their ranks to admit the elephant, and separating it from assistance, compelled its conductors to calm the animal's fury, and to submit—sometimes, instead of obeying, turned upon those it was employed to assist—one elephant is known to consume as much as forty men in a day—they are now chiefly employed in carrying or drawing burthens throughout the peninsula of India—it can, with ease, draw more than six horses can remove—it carries upon its back three or four thousand weight; and upon its tusks it can support near a thousand—when pushed, it moves as swiftly as a horse at full gallop—it travels fifty or sixty miles a day; and, hard pressed, almost double that quantity—heard trotting on at a great distance—its track is deeply impressed on the ground, and from fifteen to eighteen inches in diameter—used in India as executioners, and with what dexterity they perform the horrid task—sometimes they impale the criminal on their enormous tusks—two surprising instances how sensible it is of neglect—the keeper despising its endeavours in launching a ship, the animal redoubled its efforts, fractured its skull, and died upon the spot—revenge one of them took upon a taylor who pricked its trunk with a needle at Deli—is mindful of benefits—instance of it—at the Cape of Good Hope they are hunted for the sake of their teeth—in what manner—account of an unhappy huntsman—teeth of the elephant found in a fossil state—two great grinding teeth, and part of the tush of an elephant, discovered at the depth of forty-two yards, in a lead mine in Flintshire, 258. to 263—tusks of the elephants that come from Africa seldom exceed two hundred and fifty pounds—it is defeated by the rhinoceros, 264, 265.

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- Georgians*, their description, ii. 212.
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carcajou in North America—general description—Ray and others doubt of its existence—takes its prey by surprize, and in what manner—darts down from branches of trees upon the elk, or the reindeer, sticks its claws between their shoulders, and remains there firm, eating their necks, and digging to the great blood-vessels that lie on that part—amazing quantity one of these animals can eat at a time; that seen by Mr. Klein, without exercise or air, taken from its native climate, and enjoying but indifferent health, eat thirteen pounds of flesh every day, and was not satisfied—it continues eating and sleeping, till its prey, bones and all, be devoured—prefers putrid flesh to that newly killed—it is so slow, that any quadrupede can escape it, except the beaver—pursues it upon land; but the beaver taking water, the glutton has no chance to succeed—called the vulture of the quadrupedes—in what manner it makes up by stratagem the defects of nature—the female goes with young four months, and brings forth two or three—the male and female equally resolute in defence of their young—is difficult to be skinned—does not fear man—is a solitary animal, and never in company but with its female—couples in the midst of winter—the flesh not fit to be eaten—the fur has the most beautiful lustre, and preferred to all, except the Siberian fox, or the sable, 366 to 374.

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of its trunk, justly deemed one of nature's master-pieces—implement with which the gnat performs its work in summer—places where it spends the winter—the little brood so numerous, that the water is tinged with the colour of the species—some gnats oviparous, others viviparous, and come forth in a perfect form; some are males, and unite with the female; some are females, requiring the male; others are of neither sex, and produce young without copulation—at the sixth generation their propagation stops, the gnat no longer reproduces its likeness, but requires the male to renew its fecundity—produced in multitudes beyond expression in America; and found of all sizes, from six inches long, to a minuteness beyond the perception of the common eye—native Indians, anointed with oil, sleep in cottages covered with thousands of gnats, and have not their slumbers interrupted by these cruel devourers, viii. 84 to 90.

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not apt to curdle in the stomach—flesh of the goat, properly prepared, ranked by some not inferior to venison—is never so good and so sweet, in our climate, as mutton—no man can attend above fifty goats at a time—flesh of the goat found to improve between the tropics—remarkable varieties in this kind—that of Natolia, by Mr. Buffon called *goat of Angora*—its description—the *Affyrian goat* of Gesner—chiefly kept about Aleppo—*little goat of America*, the size of a kid; has hair as long as the ordinary breed—*Juda goat*, not larger than a hare—common in Guinea, Angola, and the coast of Africa—*blue goat*, at the Cape of Good Hope—its description, iii. 49 to 55—boundaries between the goat and deer kind difficult to fix—*Bezoar goat*, the *pasan*, found in the mountains of Egypt, &c. 69—*African wild goat* of Grimmus, fourth anomalous of the kind—its description, 75—goats eat four hundred and forty-nine plants, and reject a hundred and twenty-six, 163—in Syria, remarkable for their fine, glossy, long, soft hair, 196.

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- Greatab*, river in Yorkshire running under ground, and rising again, i. 209.
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- Greenland*, Krantz's account of the formation of ice-mountains in that country, i. 229—*aurora borealis*, its appearance almost constant in winter—the inhabitants not entirely forsaken in the midst of their tedious night; this *aurora* affording them light for the purposes of existence, 361—they live mostly upon seals—their number daily diminishing, and why, iv. 170.
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- Guinea-ass*, larger and more beautiful than the horse, ii. 354.
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- Guinea-horse*, remarkable sports with it among the grandees of that country, ii. 334.
- Guinea-pig*, by Brisson placed among the rabbit kind—native of the warmer climates—rendered domestic, and now become common every where—its description—in some places a principal favourite; often displacing the lap-dog—manner of living among us—most helpless and inoffensive, scarce possessed of any courage—their animosity exerted against each other; often fight obstinately, and the stronger destroys the weaker—no natural instinct; the female sees her young destroyed, without attempting to protect them—suffer themselves to be devoured by

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by cats—fed upon recent vegetables, they seldom drink—sometimes gnaw cloaths, paper, or other things of the kind—drink by lapping—confined in a room, seldom cross the floor, but keep along the wall—never move a-breast together—chiefly seek the most intricate retreats, and venture out only when all interruption is removed, like the rabbits—in cold weather more active—a very cleanly animal—their place must be regularly cleaned, and a new bed of hay provided for them once a week—the young falling into the dirt, or other ways decomposed, the female takes an aversion to them, and never permits them to visit her more—her employment, and that of the male, consists in smoothing their skins, disposing their hair, and improving its gloss; and take this office by turns—do the same to their young, and bite them when refractory—reared without artificial heat—no keeping them from fire in winter, if once permitted to approach it—manner of sleeping—the male and the female watch one another by turns—generally capable of coupling at six weeks old—time of their gestation—the female brings forth from three to five at a time; not without pain—the female admits the male the very day she has brought forth, and again becomes pregnant—suckles her young about twelve or fifteen days; and suffers the young of others, though older, to drain her, to the disadvantage of her own—produced with eyes open, and in twelve hours equal to the dam in agility—capable of feeding upon vegetables from the beginning—their disputes for the warmest place, or most agreeable food—manner of fighting—flesh indifferent food—difficultly tamed—suffer no approaches but of the person who breeds them—manner of eating—drink seldom, and make water often—grunt like a young pig—appear to chew the cud, iv. 52 to 59.

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Gymnotus, the *carapo*, description of this fish, vi. 282.

Gyr-falcon, exceeds all others in largeness of size—its description, v. 108.

Gyrle, name given by hunters to the roe-buck, the second year, iii. 126.

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Hæmorrhoids, a kind of serpent, vii. 198.

Hail, Cartesians say, is a frozen cloud half melted and frozen again in its descent—the most injurious meteor known in our climate—hail-stones fourteen inches round—struck out an eye of a young man, and killed him on the spot—a dreadful shower, recorded by Mezeray, fell in 1510; the hail-stones were of a blueish colour, and some weighed an hundred pounds—the fishes were great sufferers in that general calamity, i. 348 to 351.

Hair of the Roman ladies praised for the redness of its shade, ii. 69—found most different in different climates—marks the country and the disposition of the man—by the ancients held a sort of excrement, produced like the nails—according to moderns, every hair lives, receives nutriment, fills, and distends, like other parts of the body—takes colour from the juices flowing through it—each, viewed with a microscope, consists of five or six lesser, wrapped up in one common covering, and sends forth branches at the joints—suitable to the size or shape of the pore through which it issues—bulbous at the root, and its end resembles a brush—length and strength of hair a mark of a good constitution—Americans and the Asiatics have it thick, black, strait, and shining—inhabitants of the torrid climates of Africa have it black, short, and woolly—the people of Scandinavia have it red, long, and curled—opinion that every man has dispositions resembling those of the inhabitants of countries he resembles in the colour and nature of his hair—curled hair among us a beauty—the Greeks have taken one of their national distinctions from the length and straitness of the hair—Americans take the greatest pains in cutting their hair—variety in customs and manner of cutting hair, 79 to 89—trade of the inhabitants of Angora with the hair of animals of their country
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mouth—live seven or eight years, and come to perfection in one year—females live longer—Mr. Buffon makes a doubt of it—seldom heard to cry, except when seized or wounded—their cry nearly like the squalling of a child—are easily tamed—though never so young, regain their native freedom at the first opportunity—have a good ear, and been taught to beat the drum, dance to measure, and go through manual exercise—make themselves a form where the colour of the grass resembles that of their skin, open to the south in winter, and to the north in summer—sore hunted, will start a fresh hare, and squat in its form—some enter holes like the rabbit, by hunters termed going to vault—as it tires, treads heavier, and its scent is stronger—young hares tread heavier than old—male makes doublings of greater compass than the female—divided by hunters into mountain and meased hares—mode of expression, the more you hunt, the more hares you shall have, and why—what animals persecute the hare—its enemies so various, that it seldom reaches the short term limited by nature—in countries near the north pole, they become white, and are often in great troops of four or five hundred—their skins sold for less than seven shillings a hundred—the fur known to form a considerable article in the hat manufacture—found also entirely black, in much less quantity than the former—some have been seen with horns, but rarely—those in hot countries smaller than ours—those in the Milanese the best in Europe—scarce a country where not found, from the torrid zone to the polar circle—natives of Guinea kill numbers at a time; in what manner—the Jews, ancient Britons, and Mahometans, all considered it as an unclean animal, and religiously abstained from it—hare and rabbit distinct kinds—refuse to mix with each other—an instance—laws made for the preservation of them, iv. 1 to 16.

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- Havannah*, in the fortunate expedition which gave us that place, the climate left not a fifth part of the army survivors of the victory, i. 301.
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Huso, the isinglass fish, caught in great quantities in the Danube, from October to January—furnishes the commodity called isinglass—often above four hundred pounds weight—its flesh salted is better tasted, and turned red like salmon, vi. 255, 256.

Hyaena, no words give an idea adequate to this animal's figure, deformity, and fierceness—more savage and untameable than any quadrupede—its description—defends itself against the lion, is a match for the panther, and attacks the ounce, which it seldom fails to conquer—an obscene and solitary animal—its first howl sometimes mistaken for the voice of a man a-moaning—its latter like the violent efforts of reathing—whence it first took its name—native of the torrid zone, resides in the caverns of mountains, the clefts of rocks, or dens it has formed under earth—taken ever so young, it never can be tamed—sometimes attacks man, and carries off cattle—its eyes shine by night; and it is asserted that it sees better by night than by day—scrapes up graves, and devours dead bodies, how putrid soever—absurdities of the ancients about this animal, iii. 316 to 320.

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Jabiru, and *jabiru* and *jabira-guacu*, birds of the crane kind, natives of Brasil—their descriptions, v. 346.

Jackalls, hunt in a pack, and encourage each other by mutual cries—what has given rise to the report of its being the lion's provider, ii. 296—travellers have mistaken the jackall for the fox, iii. 308—one of the commonest wild animals in the East; yet scarce any less known in Europe; or less distinctly described by natural historians—its description—its cry a lamentation resembling that of human distress—is more noisy in its pursuits than the dog, more voracious than the wolf—never goes alone, but always in a pack of forty or fifty together—seems little afraid of man; pursues its game to the doors, without apprehension—enters insolently into sheep-folds, yards, and stables, and finding nothing else, devours leather harnesses, boots, and shoes—scratches up new made graves, and devours the corpse, how putrid soever—the corpse how dug up—follows armies, and keeps in the rear of caravans—the most putrid substances it greedily devours—hides in holes by day, and appears abroad at nightfall—hunts by the scent—irreconcilable antipathy between it and the dog—no wonder it be voracious, and why—is as stupid as impudent—instance of it—Indian peasants often chase it as we do foxes, 309 to 313.

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Jacobines, a kind of pigeons, v. 259.

Jaculus, the swiftest serpent, its manner of progression by coiling, vii. 167.

Jaguar, or the panther of America, iii. 233.

James, the hermit, said to have lived an hundred and four years, ii. 121.

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Japanese, description of that people, ii. 204.

Jaw, the upper, thought by many quite immoveable; that it moves in man, an easy experiment will evince—has its proper muscles behind the head for thus raising and depressing it—under jaw in the embryo much advanced before the upper; in the adult it hangs more backward—and in a Chinese face it falls still more backward than with us; the difference is thought half an inch, the mouth being shut naturally—a professor at Edinburgh was subject to have his jaw dislocated—the under jaw has often an involuntary quivering motion; and often a state of langour produces another, that of yawning, a very sympathetic kind of languid motion—ridiculous instance of this sympathetic affection commonly practised upon the famous M'Laurin, ii. 82, 83.

Jay, one of the most beautiful of the British birds—its description—feeds upon fruits, kills small birds, and is extremely docile, v. 213—lays its eggs in the holes deserted by the wood-pecker, 223.

Ibex, a native of the Alps, the Pyrenees, and the mountains of Greece—its description, iii. 58.

Ibis, the Egyptians paid divine honours to this bird, v. 342—different opinions concerning the ancient and modern ibis—Maillet's observations to this purpose—the true ibis thought a bird of the vulture kind, called by some the capon of Pharoah, 343.

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Ichneumon, by some injudiciously denominated the cat of Pharoah, one of the boldest and most useful animals of the weasel-kind—used in Egypt for the same purposes as cats in Europe—description—discovers and destroys the eggs of the crocodile—serpents its most natural food—grows fast and dies soon—

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soon—easily strangles a cat stronger and larger than itself—countries where found—attacks every living thing it is able to overcome, and fears not the force of the dog, nor the claws of the vulture—takes the water like an otter, and will continue under much longer—not able to support the rigour of our winters—one from the island of Ceylon climbed up the walls and the trees with very great ease—this animal one of those formerly worshipped by the Egyptians, iii. 348 to 352.

Ichneumon fly, its weapon of defence—flies of this tribe owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity—of all others the most formidable to insects of various kinds—it makes the body of the caterpillar the place for depositing its eggs—the tribe is not the caterpillar's offspring, as was supposed, but its murderers—description—whence its name—fears not the wasp, and plunders its habitations—various appetites of the various kinds of this fly—the millions of insects this fly kills in a summer inconceivable, viii. 47 to 50.

Ichneumon, a root the Indians believe an antidote for the bite of the asp or the viper, iii. 350.

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Ignis fatuus, or *wandering fire*, i. 354.

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King-fisher, the *Halcyon*—Cicero has written a long poem in praise of this bird, of which but two lines remain—the emperor Gordian has also written a poem on it, nothing of which is left—St. Ambrose's credulity concerning this bird—fables the modern vulgar have of it—its flesh unfit to be eaten, and its

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to the sea—peculiar preparation for spawning—the young from eggs—the female remains at the place where produced—they are excluded till they come forth—has her family playing about her, and conducts them in triumph to the ocean—its food—some continue in fresh water till they die—a single brood the extent of the female's fertility, two years being the limit of her existence—best season for them the months of March, April, and May—are usually taken in nets with salmon; sometimes in baskets at the bottom of the river—old custom for the city of Gloucester annually to present the king with a lamprey pie—a senator of Rome used to throw into his ponds such of his slaves as displeased him, to feed the lampreys, vi. 243 to 248.

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hangs itself on the fork of a tree—they destroy and devour each other—after incredible devastations, they separate into armies, opposed with deadly hatred, and move along the coasts of the larger lakes and rivers—the Laplanders form prognostics from the manner of their arrangement—what prognostics—the divisions continue their engagements and animosity until one party be overcome; then they disappear, and it is supposed, that, having nothing to subsist on, they devour each other—their carcases sometimes infect the air for miles around, and produce malignant disorders—they seem also to infect the plants, the cattle often dying in the places where they passed—the male larger and more beautifully spotted than the female—are extremely prolific—breeding does not hinder their march, some carrying one young in their mouth, and another on their back—are greatly preyed upon by the ermine, and even by the rein-deer—dogs and cats detest their flesh, but the Laplanders esteem it good eating, and devour it greedily, iv. 80 to 85.

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Life, formerly supposed producible only by oviparous and viviparous generation; but later discoveries induce many to doubt whether animal life may not be produced merely from putrefaction, ii. 20—the beginning of our lives, as well as the end, is marked with anguish, 44—that of infants very precarious, till the age of three or four—instances of it, 54—the duration of life in general nearly the same in most countries, 187—the most useless and contemptible of all others, the most difficult to destroy, viii. 104.

Light, the hand exposed to broad day-light for some time, then immediately snatched into a dark room, will still be luminous, and remain so for some time, and why—dangerous to the sight to look steadily upon bright and luminous objects, and why—such persons as read or write for any continuance, should choose a moderate light, ii. 146, 147.

Light sent forth by the glow-worm, how produced hitherto inexplicable, viii. 75—sent forth by the star-fish, resembles that of phosphorus, 106.

Lightning is an electrical flash produced by the opposition of two clouds, i. 348—flashing without noise, illuminates the sky all around in the torrid zone, 352—of the torrid zone, is not so fatal or so dangerous as with us, otherwise those regions would be uninhabitable, 353.

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Limbs of the inhabitants near the poles are sometimes frozen and drop off, i. 360—some animals live without, and often are seen to reproduce them, viii. 101.

Lime, manner of making it in Persia, i. 80.

Line, upon the approach of the winter months under the line, the whole horizon seems wrapt in a muddy cloud, i. 352—in America, all that part of the continent which lies under the line is cool and pleasant, ii. 215—in general, as we approach the line, we find the inhabitants of each country grow browner, until the colour deepens into perfect blackness, 216.

Linnaeus, the celebrated naturalist, supposes man a native of the tropical climates, and only a sojourner more to the north—argument to prove the contrary, ii. 221—his method of classing animals, 274—makes the female of the bat a *primas*, to rank it in the same order with man, iv. 129.

Linnet, a bird of the sparrow kind, v. 280, 281—taught to whistle a long and regular tune, 307.

Lion, to compare the strength of the lion with that of man, it should be considered that the claws of this animal give a false idea of its power, ascribing to its force what is the effect of its arms, ii. 102—leaps twenty feet at a spring, 295—does not willingly attack the horse, and only when compelled by the keenest hunger—combats between a lion and a horse in Italy—the lion stunned, and left sprawling, the horse escapes; but the lion succeeding, sticks to his prey, and tears the horse in pieces instantly, 293—produced under the burning sun of Africa, is the most terrible and most undaunted creature, iii. 198—description of this noble animal, 203—he degenerates when removed from the torrid zone, 197—a single lion of the desert often attacks an entire caravan, 200—he crouches on his belly, and continues so with patient expectation, until his prey comes

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comes within a proper distance, 206—the female has no mane, 205—his roaring is so loud, that when heard in the night, and re-echoed by the mountains, it resembles distant thunder, 208—attends to the call of the jackall, 312—in countries tolerably inhabited, the lion is cowardly, and often scared by the cries of women and children, 186.

Lions, those of mount Atlas have not the strength or ferocity of those of Bildulgerid or Zaara—species of this animal diminishing daily—Mr. Shaw observes, the Romans carried fifty times as many lions from Lybia in one year, for their amphitheatres, as are in the whole country at this time—the same remark made with regard to Turkey, Persia, and the Indies; where the lions diminish in their number daily—those inhabiting the peopled countries of Morocco or India, scared away with a shout—the keepers play with him, plague, and chastise him without a cause; he bears it with composure, but his anger once excited, the consequences are terrible—an instance from Labat—numberless accounts assure his anger noble, his courage magnanimous, and his natural ferocity seldom exerted against his benefactors—he has spared the lives of those thrown to be devoured by him, afforded them part of his subsistence, and sometimes abstains from food himself to support them—necessity alone makes him cruel—the manner of hunting them by Hottentots and others—reported that he sustains hunger a long time, but thirst he cannot support—some believe him in a continual fever—he drinks as often as he finds water, and laps it—he requires about fifteen pounds of raw flesh in a day—he rather hunts for a fresh spoil, than returns to that he had before—his breath is offensive, and his urine insupportable—horses for hunting them of that sort called charoffi; all others fly at the sight of him, iii. 198 to 210—the lion prefers the flesh of camels to other food—is also fond of that of young elephants—when old, finding men and quadrupedes together, he attacks the latter, and never

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never meddles with men, unless provoked—manner of copulation, time of gestation, number brought forth, and time taken to come to perfection, all known—a lion in the Tower of London above seventy years—the lioness fearing her retreat discovered, hides her tracks, by running back, or brushing them out with her tail—becomes terrible with young ones to provide for—lions, incited by desire, fight bloody battles, till one becomes victorious over the rest—the size of the lion between three and four feet; the female in all dimensions about one third less—there are properly no lions in America; the *puma* has received the name of the *American lion*, but, when compared, is a very contemptible animal, 211 to 215.

Lion-cat, or *Angora-cat*, a beautiful animal, a native of Syria or Persia, iii. 196.

Lion, (sea) described in Anson's voyages, regarded as the largest of the seal family, iv. 169.

Lipidopus, the garter-fish, its description, vi. 284.

Lips, those of the hare and the squirrel continually move, whether sleeping or waking, iv. 3.

Lithophytes and coralline substances, viii. 121.

Litters, in all animals, intermediate litters most fruitful; first and last generally produce fewest and weakest of the kind, ii. 309.

Littorales, Latin name for those shells that are cast upon shore, vii. 12.

Liver of a shark affords three or four quarts of oil, vi. 223.

Lizards, along the coasts of Guinea their flesh esteemed a delicacy, iii. 275—differ from every other class of animals, and from each other—whence the greatest distinction—general characteristics, vii. 102 to 106—the water kind changes its skin every fourth or fifth day—sprinkled with salt, the whole body emits a viscous liquor, and the lizard dies in three minutes, in great agonies—the whole of the kind sustain the want of food in a surprising manner, 133, 134.

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Lizard, (*Chalcidian*) of Aldrovandus, described, vii. 143.

Lizard, (flying) of Java, account of it by Gentil, vii. 142.

Loach, the description of this fish, vi. 286.

Lobster, a ruminating fish, iii. 5—very voracious, though without warmth in its body, or red blood in its veins—whatever it seizes upon, and has life, perishes, however well defended—they devour each other, and, in some measure, eat themselves; changing their shell and stomach every year, the old stomach is the first morsel to glut the new—at first sight, the head may be mistaken for the tail—its description—the food of the young—the molting season—how they change their shells—many die under this operation—speedy growth of the new shell; and of itself after the change—the claws of unequal magnitude, and why—at certain seasons they never meet without an engagement—wonders this extraordinary creature offers to imagination—are endowed with a vital principle, that furnishes out such limbs as have been cut away—varieties of this animal with differences in the claws, little in the habits or conformation—the shell black when taken, but turns red by boiling—common way of taking the lobster, vi. 325 to 334.

Locust, the great brown locust seen in several parts of England in 1748; in some southern kingdoms they are still formidable—description of this insect—in what manner they take the field—their devastations—are still more noxious when dead—instance of it—account of their devastations in Russia, Poland, Lithuania, and Barbary—transformations—eaten by the natives in many kingdoms of the East; and caught in small nets for that purpose—their taste—are considered as a great delicacy in Tonquin, by the rich and the poor—must have been a common food with the Jews—description of the great *West-Indian locust*, the most formidable, vii. 308 to 315.

Loir, the greater dormouse, so called by Mr. Buffon, iv. 72.

Longevity,

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- Longevity*, persons remarkable for it, ii. 185, 186.
- Lorenzini*, his experiments upon the torpedo, vi. 242.
- Lori*, the longest of all animals, in proportion to its size—description—a native of the island of Ceylon, iv. 226.
- Loricaria*, description of this fish, vi. 284.
- Lories*, a kind of parrot, v. 240.
- Loufe*, its description—whether distinguished by the parts of generation into males and females, not yet discovered—the lousy disease frequent among the ancients, vii. 246 to 250.
- Loufe*, (wood) the description—of great use in medicine, vii. 260, 261.
- Luminous* appearance of the waves in the night, the cause, i. 231.
- Lump-fish*, its description—flung into a pail of water, will stick so close to the bottom, that on taking the fish by the tail, the pail and several gallons of water may be lifted—their flesh, vi. 260.
- Lungs*, animals before birth make no use of their lungs, iv. 159—no anatomist has described the lungs of the lamprey, vi. 245—caterpillars have eighteen lungs, and live several days in the exhausted receiver of the air-pump, vii. 347.
- Lybia*, its inhabitants use ostriches as horses—also at Joar—instance of it at the factory of Podore, v. 57.
- Lyboija*, a serpent of Surinam, thirty-six feet long, vii. 157.
- Lynx*, distinguished from the ounce, and described—first striking distinction between it and those of the panther-kind is the tail—each hair of this animal is of three different colours—about the size of the ounce—chiefly met with in the cold northern countries—those of the new continent are smaller than in Europe—formerly called *lupus cervarius*, but for what reason hard to guess—in its nature it exactly resembles the cat, is bigger, and near two feet long,
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is also bolder and fiercer—is more delicate than the cat—resembles the wolf in nothing, except its cry—several reports of the lynx, propagated by ignorance or imposture, iii. 238 to 246.

Lyfter, his strange theory to explain the invariable motion of winds, i. 319.

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Macaguo, a kind of monkey described by Mr. Buffon, iv. 218.

Maccaw, the large kind of parrot the size of a raven, v. 240.

Machinel-tree, its shade fatal, i. 305—no plant will grow under it, ii. 4.

Machines, the invention of many has rendered human strength less valuable, ii. 110.

Mackarel, produces five hundred thousand eggs, in one season, vi. 161—described, 279—its growth, 309.

Madagascar, its natives desire nothing so ardently as to prostitute their wives or daughters to strangers, and for the most trifling advantages, ii. 68—the great bat of that island described, iv. 132.

Maddor. See *Blood*, ii. 179.

Madness produced by want of sleep, ii. 124—cured by music—and also caused by it. See *Henry IV.* ii. 156.

Maelstrom, Dutch name for a whirlpool, one upon the coast of Norway, considered as most dreadful and destructive—the body of water forming this whirlpool, extended in a circle of above thirteen miles, i. 249.

Magellan, (Ferdinand) a Portuguese of noble extraction, first discovered the gigantic race of mankind, in 1520, towards the extremity of South America—account of this discovery—he was slain upon one of the Molucca islands, ii. 238.

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Maggot of Buffon, the *cynocephalus*, the last of the ape kind—its description, iv. 194.

Magni, an Italian traveller, discovered the remarkable grotto of Antiparos, in the Archipelago, i. 62.

Magpie thievish; rings found in the nest of a tame magpie, v. 196—habits and food—when satisfied for the present, it lays up the remainder for another time—places where it builds, and nests, described—number of eggs—in its domestic state, preserves its natural character strictly—foolish custom of cutting its tongue to teach it to speak, puts the animal to pain, and baulks the intention, v. 210 to 213.

Mabometans, considering the hare an unclean animal, religiously abstain from its flesh, iv. 13.

Maimon, the last of the baboons, Edwards calls it the *pigtail*—its description—native of Sumatra, does not well endure the rigours of our climate, iv. 202.

Maire, (James Le) a traveller who confirms the existence of giants in America, ii. 240.

Maki, the last of the monkey-kind, iv. 176—their description—many different kinds of these animals, 223, *et seq.*

Malabar, land and sea breezes upon those coasts, i. 327.

Malacopterigii, the barbarous Greek name given to the soft-finned fish; the prickly-finned sort termed *Acanthopterigii*, vi. 275.

Malaballo, a volcano in South America, i. 92.

Malbrouk, a monkey of the ancient continent—its description—the Bramins have hospitals for such as are sick, or disabled, iv. 219.

Maldivia islands, have lands in them at one time covered with water, and at another free, i. 261.

Malebranche, grounds his beautiful theory of monstrous productions upon a famous instance related by him; and some theory from which he deduces the effects of imagination upon the fœtus, ii. 225.

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Mallard, a kind of duck, vi. 116—with very particular faculties for calling, 120.

Malpighi, his famous experiment upon the stigmata of caterpillars, vii. 348.

Mammouth, its tusks, which are used as ivory, and supposed to belong to the elephant, often weigh four hundred pounds, iv. 264.

Man, endures a greater variety of climates than the lower orders of animals are able to do, and why, i. 298—differences in his species less than in animals and rather taken from the tincture of the skin than variety of figure—there are not in the world above six distinct varieties in the race of men—first race in the polar regions, deep brown, short, oddly shaped, savage—second, the Tartar race, olive coloured, middle sized, ugly, robust—third, the southern Asiatics, dark olive, slender shaped, strait black hair, feeble—fourth, the negroes of Africa, black, smooth skin, woolly hair, well shaped—fifth, the Americans, copper colour, strait black hair, small eyes, slight limbed, not strong—sixth, the Europeans and bordering nations, white of different tints, fine hair, large limbed, vigorous, ii. 195 to 212—may be called the animal of every climate, 8—intended naturally to be white, 214—white men resemble our common parent more than the rest of his children—a native of the tropical climates, and only a sojourner more to the north, according to Linnæus—arguments sufficient to prove the contrary, 221—marriageable in the warm countries of India at twelve and thirteen years of age, 64—just come into the world gives a picture of complete imbecillity, 48—vain man ventures to excite an auditor's attention, at the risk of incurring his dislike, 91—as man has a superiority of powers over other animals, so is he proportionably inferior to them in his necessities—nature has made him subject to more wants and infirmities than other creatures: but all these wants seem given to multiply the number of his enjoyments—and in what manner, 112—first sensations

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Manati, may indiscriminately be the last of beasts, or the first of fishes—its description—the female has breasts placed forward, like those of women—the tongue so short, some have pretended it has none—never entirely leaves the water, only advances the head out of the stream, to reach the grass on the river sides—it feeds entirely on vegetables—places where found—graze among turtles and other crustaceous fishes, giving or fearing no disturbance—unmolested, they keep together in large companies, and surround their young—bring forth in autumn; and supposed to go with young eighteen months—the manati has no voice nor cry—its intestines are longer in proportion than those of any other creature, the horse excepted—the fat which lies under the skin, exposed to the sun, has a fine smell and taste, and exceeds the fat of any sea animal—the heat of the sun does not make it rancid; it tastes like the oil of sweet almonds, and serves every way instead of butter; any quantity may be taken inwardly, having no other effect than to keep the body open—the fat of the tail, boiled, more delicate than the former—the lean takes a long time in boiling, and eats like beef—the fat of the young like pork, and the lean like veal, iv. 171 to 174.

Mandril, the largest of the baboon kind—its description—when displeased, weeps like a child—is a native of the Gold Coast, iv. 201.

Mangabey, a monkey of the ancient continent—its description, iv. 219.

Mangrove-tree, that grows down in the water of the Senegal river, i. 205.

Manufactures,

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Manufactures, the woollen manufacture not carried on here till several ages after sheep were propagated in England—unavailing efforts of our kings to introduce and preserve it—the Flemings possessed the art in a superior degree—the inhabitants of the Netherlands improved us in this art, and when—the woollen manufacture supposed for some time decaying amongst us—received every encouragement from Queen Elizabeth, iii. 40—of stuffs of the wool of the pacos, a considerable branch of commerce in South America, iv. 293.

Manyfold, name of the third stomach of ruminating animals, iii. 4.

Map of the bottom of that sea between Affica and America, by Buache, i. 271.

Marcafites, their composition—experiment by way of proof, i. 71.

Mares, their exportation prohibited by a law in Arabia, ii. 324—studs in Persia of ten thousand white mares, with hoofs so hard that shoeing is unnecessary, 326—a law in England, prohibiting the exportation of mares and stallions; and one similar to this obtained so early as the times of Athelstan, 339.

Marikina, a monkey of the sagoin kind, with a mane round the neck, and a bunch of hair at the end of the tail, like a lion, iv. 222.

Mariners, to multiply their numbers, queen Elizabeth enjoined that her subjects should fast from flesh on Fridays and Saturdays, ii. 119.

Marle, different sorts found in a well dug at Marly, i. 53.

Marmose, only differs in size from the oppossum, being less; instead of the bag to receive the young, has only two longitudinal folds, within which the premature young, continue to suck—when first produced not above the size of a bean; but stick to the teat until they arrive at maturity, iv. 232.

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Marmout, or *marmotte*, a ruminating animal, iii. 5—
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tamed, readily taught to dance, wield a stick, and
obey the voice of its master—it has an antipathy
to the dog—strength and agility—ludicrous saying
that the Savoyards, the only chimney-sweepers of
Paris, have learned their art from the marmotte
they carry about for shew—is apt to gnaw the fur-
niture—other affections of this animal—its food—is
cleanly, but has a disagreeable scent—sleeps during
winter—form of its hole resembles the letter Y—
manner of making it—they live together, and work
in common to make their habitations snug and con-
venient—when they venture abroad, one is placed
as a centinel upon a lofty rock—Mr. Buffon says
it does not sleep during winter, is rather in a torpor,
a stagnation of all faculties—its heat not more than
ten degrees above congelation—the flesh said to
have a wild taste, and to cause vomiting—countries
where it is found—inhabitants of the Alps do not
till winter open its hole—produces but once a year,
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Marriage and consummation of the Indians, the hus-
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Marriotte, his experiment proves that water acts as a
menstruum upon air, i. 344.

Marrow, spinal, and the brain, the first seen as begun
in the embryo, ii. 134.

Marfigli, (count) his opinion upon corals and sponges,
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Martin, its description—the most beautiful of all
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able than the white-breasted sort—Mr. Buffon sup-
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iii. 340, 341—resembles the ermine and polecat, and like them is fond of honey, 331—seldom meets the wild-cat without a combat—wild-cat not a match for the martin—kept tame by Gesner and Mr. Buffon—often slept for two days, and then was two or three days without sleeping—the yellow-breasted more common in France than England—in that retreat the female brings forth her young, three or four at a time—and they come with the eyes closed—how she compensates for her deficiency of milk—this animal more common in North America than in Europe—found in all northern parts of the world, from Siberia to China, and Canada—in every country hunted for their furs, very valuable, and chiefly so when taken in the beginning of winter—one part of its skin most esteemed—twelve thousand of these skins annually imported into England from Hudson's-bay, and thirty thousand from Canada—small birds alarm the spot where the dam keeps her young, and direct the hunter in his pursuit, 342 to 345—its nest generally the tenement of the squirrel, taking possession, and killing the owner—the white-breasted keeps near houses and villages; the yellow keeps in woods, leads a savage life, iv. 29—seizes also the flying squirrel, 35.

Martin, a bird of the swallow tribe, v. 308.

Marum, cats excessively fond of this plant, iii. 191.

Mastiff, one of the three descendants of the shepherd's dog—chiefly a native of England; when transported into Denmark, becomes the little Danish dog, iii. 263—the Dutch mastiff, 264.

Mastiff-fox, second variety of foxes, less than the greyhound-fox, and stronger than the cur-fox, iii. 308.

Maturity, attained to by slow steps, announces a slow march to old age—as true in other animals as in man and vegetables, ii. 184—sooner arrived at in India than in Europe, 206.

Maw, in fishes, possesses the power of digesting, vi. 149.

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- Maximin*, (the emperor) a prodigy of strength—several instances of it—by birth a Thracian; from being a simple herdsman he rose by the gradations of office, until he came to be emperor of Rome, was above nine feet in height, and the best proportioned man in the empire—was killed by his own soldiers, while sleeping, ii. 108.
- May-bug*, or *dorr-beetle*, described, viii. 65 to 70. See *Beetle*.
- Measled hares*, distinguished from mountain hares, they keep in low grounds, their flesh moist, white, and flabby, iv. 11.
- Mechanism*, which regulates the number of our years, admits no change in its laws, and can be affected only by long fasting, or great excess, ii. 186.
- Medauro*, the brass helmet dug up there fits a common man, yet is allowed to have been left there at the overthrow of Asdrubal, ii. 243.
- Media*, has pastures in its plains excellent for rearing horses, ii. 332.
- Medicine*, many of its salutary purposes obtainable from some parts of the ostrich; v. 58—also from many parts of quadrupedes, iii. 64.
- Mediterranean sea*, always receiving, and never discharging water, is no way fuller than before—in what manner some account for this, i. 245, 246—water spouts seen in it—description of them by Tournefort, 364—solutions offered for this phenomenon by Mr. Buffon and Dr. Stewart, 367—this sea one of the smoothest and most gentle in the world, 249.
- Medusa*, name given by Linnæus to a small insect, thought the simple food of the great Greenland whale—walfischoas, the name given to it by the Icclander, vi. 182.
- Meibomius*, has collected some few remains of ancient music, which do not leave room to regret what is lost, ii. 155.

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Membrane, the nictitating membrane in birds—veils the eye at pleasure, whilst the eye-lid continues open, v. 9.

Mendip mines, in Somersetshire, account of them by Mr. Locke, i. 72.

Menstruum, that body which is most fluid and penetrating, is likely to be the menstruum of one less so—Marriotte's experiment shews that water will act as a menstruum upon air, i. 344—cold diminishes the force of menstrooms, and often promotes evaporation, 345.

Merlin, the smallest of the hawk or falcon-kind, scarce larger than a thrush, displays a degree of courage rendering him formidable to birds far above his size—kills a partridge or a quail at a single pounce from above, v. 109—the pursuit of the lark by a couple of merlins is a most delightful spectacle, 115.

Metals, the richest, in their native state, less glittering and splendid than useless marcasites, i. 69—those trades that deal in their preparations, always unwholesome, 304—all pieces swallowed by animals lose part of their weight, and often the extremities of their figure, v. 51.

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Method, the principal help in natural history; without it little progress made in this science, ii. 265—the most applauded of classing animals, 270—the author's method of classing them, 276—that of describing all things by words alone, a fault that has infected most of our dictionaries, and bodies of arts and sciences—Mr. Locke has observed, that the drawing of an animal, taken from life, is the best method of advancing natural history, 282.

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Mew, laid of stags when they cast their heads, iii. 105.

Mice, have burrowed in the backs of hogs, while fattening in the sty, without being felt, iii. 164—and rats cannot endure the scent of the genetie, 360—in 1580, at Hallontide, an army of mice over-run the marshes near Southminster, and eat up the grafs to the roots; but soon after they were all devoured by a number of strange painted owls, v. 133.

Mico, the least and most beautiful monkey of the sa-goin kind—its description by Mr. La Condamine, iv. 222.

Microscope, encreases the magnitude of an object, and that of its motion also, ii. 19—the pupil and humours of the eye of the mole discovered by it, iv. 87.

Migrating fishes, the herring and the pilchard take the most adventurous voyages—stated returns, and regular progress of the migrating fishes, one of the most extraordinary circumstances in the history of nature, vi. 295 to 297.

Migration, causes of migrations of birds—in what manner they perform them—at what times—rather follow weather than country, and go on as they perceive the atmosphere more suitable to their wants and dispositions—migration of some swallows, and retreat of others into old walls, to avoid the rigour of winter, wrap this subject in great obscurity, v. 29, *et seq.*—of bees, several signs previous to it, viii. 21.

Milan, hares bred in the Milanese, thought the best in Europe, iv. 13.

Milk, infants have it in their own breasts, ii. 54—sometimes found in the breasts of men, as well as in those of women, 94—in carnivorous animals, more sparing than in others, 310, and iii. 339—of goats, medicinal, and not apt to curdle upon the stomach, as that of the cows, iii. 51—of the rein-deer,

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- Mire-drum*, the bittern, described, vi. 2 to 5. See *Bittern*.
- Mistletoe*, a plant thought propagated by seeds voided by birds, v. 281.
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- Mock-suns*, meteors, and other phenomena, in the northern regions, i. 352.
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- Modena*, a city in Italy—its remarkable wells—other rarities round it, i. 263.
- Mogul*, in the Indian language, signifies a white man, ii. 206.
- Mold*, black, or garden-earth, the first layer on the surface of the globe—is formed from animal and vegetable bodies decayed—soil fertile, in proportion to the quantity that putrified mold bears to the gravelly mixture, i. 48, 49.
- Mole*, a ruminating insect, or seemingly so, iii. 6—no quadrupede fatter, none with a more sleek glossy skin—an utter stranger in Ireland—formed to live under

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under the earth—its description—the ancients, and some moderns, of opinion, that the mole was blind; but Derham, by a microscope, discovered all the parts of the eye known in other animals—a mole let loose in the midst of a field, like a ghost on a theatre, instantly sinks into the earth; and an active labourer, with a spade, pursues it in vain—peculiar advantage of the smallness of its eyes—when once buried in the earth, it seldom stirs out—it chuses the looser, softer grounds—chiefly preys upon worms and insects—is most active, and casts up most earth, immediately before rain, and in winter, before a thaw—in dry weather, it seldom forms hillocks—readily evades the pursuit of animals stronger and swifter than itself—its greatest calamity is an inundation—in some places considered by the farmer as his greatest pest—couples towards spring, and the young found about the beginning of May—generally four or five at a time—description of the mole-hill, in which the female has brought forth her young—is scarcely found, except in cultivated countries—the varieties are but few—that of Virginia is black, mixed with a deep purple—that of Poland is white—Agricola says he saw hats made of mole-skins, the finest and most beautiful imaginable, iv. 85 to 93.

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them, without receiving any injury—they provoke the snake, as the sparrows twitter at a cat—when attacked, they shew perfect skill in defending and assisting each other—they regularly begin hostilities against those who enter their woods—they take most desperate leaps, and seldom come to the ground—one being wounded, the rest come round, put their fingers into the wound, as desirous of sounding its depth—the blood flowing in any quantity, some stop it, while others get leaves, chew, and thrust them into the opening—are often killed in numbers before they make a retreat, with the same precipitation as they at first came on—in this retreat the young are clinging to the back of the female, who jumps away, seemingly unembarrassed by the burthen—usual way of taking them alive—the monkey not killed outright, does not fall; but clinging to some branch, continues, when dead, its last grasp, and remains where shot, untill it drops by putrefaction—skinned and served up at negroe-feasts, so like a child, an European is shocked at the sight—the negroes seeing Europeans buy young and tame monkies, with equal care brought rats to the factors for sale, and were greatly disappointed, finding no purchaser—negroes cannot comprehend advantages arising from educating or keeping animals, who come in companies to lay waste fields of corn or rice, or plantations of sugar-canes—they carry off what they are able, and destroy ten times more—manner of their plundering—are under a kind of discipline, exercised among themselves—account to this purpose by Margrave—one species, by Mr. Buffon called the ouarine, remarkable for loudness and distinctness of voice—use to which they convert it—are generally together in companies, march in exact order, and obey the voice of some chieftain, remarkable for his size and gravity—chief food of the tribe—extraordinary manner of managing an oyster, 207 to 213—manner of drawing crabs from the water—no snare, however nicely baited, takes a monkey of the West-Indian islands—female brings

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forth one, and sometimes two at a time—rarely breed when brought into Europe—the male and female never tired of fondling their young, and instruct it with no little assiduity—often severely correct it, if stubborn, or disinclined to profit by their example—manner of carrying their young in the woods—dexterity in passing from one tree to another, by forming a kind of chain, locking tail in tail, or hand in hand—one amused itself for hours imposing upon the gravity of a cat, and playing its pranks among rabbits—faithful services which father Carli received from the monkies in Angola, where he went to convert the savage natives to Christianity—savages of Africa and America suppose monkies to be men; idle, slothful, rational beings, capable of speech and conversation, but obstinately dumb, for fear of being compelled to labour—monkies of Africa most expert and entertaining—shew a greater degree of cunning and activity—three marks by which monkies of the new continent are distinguished from those of the old—Mr. Buffon makes but nine species of monkies belonging to the ancient continent, and eleven to the new—their names, with their descriptions—the *red African*, the *patas*, second sort of the ancient continent—the *white nose* or *moustac*, of the ancient continent, most beautiful; its description—the *green* of St. Jago, also called *callatrix*, is of the ancient continent—its description—some of the kind eat their own tail, and seem to feel no pain—the Bra- mins have hospitals for those that happen to be sick, or disabled, those monkies of the new continent with muscular holding tails, are called *sapajous*, and those with feeble useless tails, are called *sagoins*—the *fox-tailed monkey*—*makies*, the last of the kind—their description, iv. 214 to 223.

Monkey-bezoar, a factitious concrete, iii. 71. See *Bezoar*.

Monoculus, the arboresecent water-flea—its description—are of a blood-red colour; and sometimes in such multitudes on standing waters, as to make them appear

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pear all over red, whence the water has been thought turned into blood—its branching arms, and the motion made with them in the water deserve great attention, vii. 261 to 263.

Monsoons, so called from a famous pilot of that name, who first used them in navigation with success—in the ocean between Africa and India, those of the east winds begin in January, and end at the commencement of June; in August, or September, the contrary takes place; and the west winds blow for three or four months, i. 324—moonsoons prevail, at different seasons, throughout the Indies, 325.

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Monstrous productions, father Malbranche's ingenious theory of—remarkable instance related by him, ii, 225.

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Moose-deer, name in America for the elk, iii, 130—its description, 134.

Mormyrus, description of this fish, vi. 286,

Morocco, the original horses there much smaller than the Arabian breed, ii. 332.

Moron, a kind of salamander, thought venomous, vii, 129.

Morse, an animal of the seal kind, might be ranked among the fishes, ii. 287—generally frequents the same places where seals reside in—different from the rest in a very particular formation of the teeth—resembles a seal, except that it is much larger—are rarely found, but in the frozen regions near the pole—formerly more numerous than at present—the Greenlanders destroyed them more before those seas were visited by European ships upon the whale fishery, than now—its teeth generally from two to three feet long—the ivory more esteemed than that of

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the elephant—the fishers have formerly killed three or four hundred morfes at once; their bones are still lying in prodigious quantities along those shores they chiefly frequented, iv. 169, 170.

Moschitoes, excessive torments caused by them—houses forsaken on their account, i. 136, 137.

Moss, the only support of the rein-deer in Lapland—of two sorts, white and black, iii. 143.

Mother-of-pearl, taken from the pearl oyster, vii. 51.

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Mouse, the most feeble, and most timid of all quadrupeds, except the Guinea-pig—never rendered quite familiar; though fed in a cage, retains its apprehensions—no animal has more enemies, and few so incapable of resistance—the owl, cat, snake, hawk, weasel, and rat destroy them by millions—brings forth at all seasons, and several times in the year; its usual number from six to ten—these in a fortnight strong enough to shift for themselves—places where chiefly found—Aristotle, having put a mouse with young into a vessel of corn, some time after found a hundred and twenty sprung from that original—its life lasts two or three years—the species found in all parts of the ancient continent, and has been exported to the new—Gesner minutely describes the variety of mouse-traps—long-tailed field-mouse—short-tailed field-mouse—has a store against winter, a bushel at a time—a description of the shrew-mouse, iv. 67 to 71.

Moustoc, or *white nose*, monkey of the ancient continent; a beautiful little animal—its description, iv. 220.

Mouth of hares lined with hair—the only animals that have it on the inside, iv. 8—the snails of the trochus kind have none—mouth of garden, water, and sea-snails, vii. 31.

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Mullus, or *surmulet*, description of this fish, vi. 280.

Multivalve shells, third division of shells by Aristotle,
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Mummy, formerly a considerable article in medicine—
Paræus wrote a treatise on the inefficacy of mummy
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Muralto, has given the anatomy of the lamprey, but
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Muræna, the eel, its description, vi. 282.

Murena of the ancients, not our lamprey, vi. 243.

Muscardin, name of the lesser dormouse by Mr. Buf-
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Muscle, the shell-fish, its description—its organs of
generation are what most deserve to excite our
curiosity—it endeavours to become stationary, and
to attach itself to any fixed object it happens to be
near—its enemies—it is supposed that those threads,
which are usually called the beard of the muscle,
are the natural growth of the animal's body, and by
no means produced at pleasure, as Reamur supposes
—its instrument of motion, by which it contrives to
reach the object it wants to bind itself to—its food
—some of this kind have been found a foot long—
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Muscles, to judge of the strength of animals by the thickness of their muscles inconclusive, ii. 110—those of the hare are strong, and without fat, iv. 4—the pectoral muscles of quadrupedes trifling in comparison to those of birds—in quadrupedes, as in man, the muscles moving the thighs and hinder parts are strongest, while those of the arms are feeble—in birds, the contrary obtains, v. 3—those of the shark preserve their motion after being separated from the body, vi. 221.

Muscovy-duck, or the *musk-duck*, so called from its musky smell, vi. 117.

Music, said by the ancients, to have been invented from the blows of different hammers on an anvil—from the remains of ancient music, collected by Meibomius, one might suppose nothing powerful in what is lost—in all countries, where music is in its infancy, the half tones are rejected—many barbarous nations have their instruments of music; and the proportion between their notes is the same as in ours—all countries pleased with music; and where they have not skill to produce harmony, they substitute noise—its effects, the ancients give us many strange instances of them upon men and animals—and the moderns likewise—madness cured by it—remarkable instance in Henry IV. of Denmark—it is now well known that the stories of the bite of the tarantula, and its cure by music, are all deceptions—instance of it—fishes are allured by music—horses and cows likewise, ii. 152 to 157—the elephant appears delighted with music, iv. 241—father Kircher has set the voices of some birds to music, v. 129.

Musk, among the numerous medicines procurable from quadrupedes, none, except the musk and hartshorn, have preserved a degree of reputation, iii. 64—a doubt whether the animal producing it be a hog, an ox,

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ox, a goat, or a deer—no animal so justly the reproach of natural historians as that which bears the musk—it has been variously described, and is known very imperfectly—the description given by Grew—formerly in high request as a perfume—has for more than a century been imported from the East—is a dusky reddish substance, like coagulated blood—a grain of it perfumes a whole room—its odour continues for days, without diminution, and no substance known has a stronger or more permanent smell—in larger quantity it continues for years; and scarce wasted in weight, although it has filled the atmosphere to a great distance with its parts—the bags of musk from abroad supposed to belong to some other animal, or taken from some part of the same, filled with its blood and enough of the perfume to impregnate the rest—it comes from China, Tonquin, Bengal, and often from Muscovy—that of Thibet reckoned the best, and of Muscovy the worst, iii. 81 to 86.

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Musky smell, does not make the characteristic marks of any kind of animals, iii. 30.

Musmon, or *mussion*, resembles a ram, its description, iii. 46.

Myoides, a broad thin skin covering the whole upper fore-part of the body, its effect in women with child, ii. 95.

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Nails, how formed in man, ii. 93—those of some of the learned men in China longer than their fingers—savages that let them grow long, use them in slaying animals, 97.

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Narwhal, the sea-unicorn—its description—errors concerning the teeth of this animal—the most harmless

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- Nerves*, wherever they go, or send their branches in number, these parts are soonest begun, and most completely finished, ii. 134.
- Ness*, a river near Bruges in Flanders—great quantities of trees found in its mouth,, at the depth of fifty feet, i. 262.
- Nest*, of every species of birds has a peculiar architecture—where eggs are numerous, the nest must be warm, v. 22—different places which birds choose for their nests, 23—description of the nest of an eagle found in the Peak of Derbyshire, 84—of the bald eagle, large enough to fill the body of a cart, 87—hanging nests in Brasil, 224—made in such manner, as to have no opening but at the bottom, 226—the Chinese get those of the swallows from the rocks, and sell them in great numbers in the East

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- Nettles of the sea*, name given by some to the star-fish, viii. 106.
- New Providence*, one of the Bahama islands—the Philosophical Transactions give account of poisonous qualities in the fish found on the coast of this island—all kinds at different times dangerous; one day serving for nourishment, and the next proving fatal, vi. 318.
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- Nieper*, or Boristhenes, a river rising in the middle of Muscovy, and running three hundred and fifty leagues to empty itself in the Black Sea, i. 195.
- Niger*, this river has a course of several hundred miles from its source at the mountains of the moon, i. 132—asserted that it is lost in the sands before it reaches the ocean, 210.
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Ocelot, or cat-a-mountain, its description—of the panther-kind—one of the fiercest, and, for its size, one of the most destructive animals in the world—its unceasing appetite rather for the blood than the flesh of their prey—it generally is on the tops of trees, like our wild cats, iii. 237 to 244.

Ocotzimitzcan, a kind of pigeon, one of the most splendid tenants of the Mexican forests, v. 261.

Odours diffused by the air as the fluid they swim in, i. 312.

Ohio, several enormous skeletons five or six feet beneath the surface on the banks of that river, lately discovered, iv. 264.

Oil, train-oil the drink of the Laplanders, ii. 199—the oil of the fish cachelot is very easily converted into

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- Oker*, the North-American Indians paint their skins with red oker, ii. 218.
- Old-man's-beard*, a kind of moss growing in Brasil, v. 226.
- Olearius*, invited by the monarch of Persia to a sport of wild asses, ii. 346.
- Olive* colour, the Asiatic of that colour claims the honour of hereditary resemblance to our common parent—an argument sufficient to prove the contrary, ii. 221.
- Oliver*, (*William*) the first who discovered that the application of sallad-oil cured the viper's bite effectually, vii. 189.
- Onager*, or the wild ass, is in still greater abundance than the wild horse, ii. 345.
- Ondatra*, one of the three distinctions of the musk-rat—a native of Canada—creeps into holes where others seemingly less cannot follow—the female has two distinct apertures, one for urine, the other for propagation—this animal in some measure resembles the beaver—its manner of life during winter, in houses covered under a depth of eight or ten feet of snow—savages of Canada cannot abide its scent, call it stinkard—its skin very valuable, iv. 73 to 75.
- Onza*, or ounce, of the panther-kind, iii. 235—the onca of Linnæus, 236.
- Ophidium*, the gilt-head, by sailors called the dolphin, its description, vi. 277.
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North and South America, of the size of a small cat, and of the monkey-kind—its description, iv. 176—a minute description of it—the young, when first produced are very small, and immediately on quitting the real womb, they creep into the false one, but the time of continuance is uncertain—Ulloa has found five young hidden in the belly of the dam, alive and clinging to the teat, three days after she was dead—chiefly subsists upon birds, and hides among the leaves of trees, to seize them by surprize—cannot run with any swiftness, but climbs trees with great ease and expedition—it often hangs by the tail, and for hours together, with the head downwards, keeps watching for its prey—by means of its tail, flings itself from one tree to another, hunts insects, and escapes its pursuers—eats vegetables as well as animal substances—is easily tamed, but a disagreeable domestic, from its stupidity, figure, and scent, which, though fragrant in small quantities, is ungrateful when copious—during its gestation, the bag in which the young are concealed may be opened and examined without inconvenience; the young may be counted and handled; they keep fixed to the teat, and cling as firm as if they made a part of the body of the mother, iv. 227 to 231.

Orange-flowers, particularly grateful to the taste and smell of the elephant, iv. 242.

Orb, description of the sea-orb, also called the sea-porcupine—is absolutely poisonous, if eaten, vi. 263.

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Organs of generation in fishes, vi. 162.

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Orkney Islands, on their shores, the sea, when agitated

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Osprey, its flesh is admired by many, and, when young, an excellent food according to Belonius, v. 77—it chiefly lives upon fish, 86—its distinctive marks, 89.

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Ostracion, a fish of the cartilaginous kind, is poisonous, vi. 264.

Ostrich, manner in which the Arabians hunt them, ii. 320, and v. 55—an Arabian horse of the first speed scarcely outruns them, 320—the greatest of birds, makes near approaches to the quadrupede class, v. 37—its flesh proscribed in Scripture as unfit to be eaten—its description—appears as tall as a man on horseback—brought into England above seven feet high—surprising conformation of its internal parts—a native only of the torrid regions of Africa—not known to breed elsewhere than where first produced—places they inhabit—the Arabians say it never drinks—will devour leather, glass, hair, iron, stones, or any thing given—in native deserts, lead an inoffensive social life—Thevenot affirms the male keeps to the female with connubial fidelity—thought much inclined to venery—some of their eggs weigh fifteen pounds, v. 45 to 52—season for laying depends on the climate where the animal is bred—these birds very prolific, and lay from forty to fifty eggs at one clutch—none has a stronger affection for her young, nor watches her eggs with greater assiduity, sit on them, like other birds, male and female by turns—assiduous in supplying the young with grass, and careful to defend them, encountering every danger boldly—way of taking them among the ancients—

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the plumes used in their helmets—the ladies of the East use them as ornaments in their dresses—plumes used in Europe to decorate our hearths and hats—feathers plucked from the animal while alive more valued than those taken when dead—some savage nations of Africa hunt them for their flesh—Helio-gabalus had the brains of six hundred dressed in one dish—a single egg sufficient entertainment for eight men—eggs well tasted, and extremely nourishing—Apicius gives a receipt of sauce for the ostrich—of all chaces, that of the ostrich, though most laborious, the most entertaining—use they make of its skin—method of hunting of the Struthophagi—its blood mixed with the fat a great dainty with the Arabians—inhabitants of Dara and Lybia breed flocks of them—tamed with little trouble—prized for more than feathers in this domestic state—often ridden upon and used as horses—Moore assures he saw a man at Joar travelling upon an ostrich; and Adanson asserts he had two young ostriches, the strongest of which ran swifter than the best English racer, with two negroes on his back—of all animals using wings with legs in running, these by far the swiftest—parts of it convertible to medicinal purposes—eggs, worst of all to be eaten according to Galen—the American ostrich, v. 53 to 58.

Otter of roses, a modern perfume, valued for its vegetable fragrance, iii. 365.

Otter, the link between land amphibious animals, resembles terrestrial in make, and aquatic in living—swims faster than it runs—is brown, and like an overgrown weasel—its description—voracious animal, found near lakes—not fond of fishing in running water, and why—when in rivers, always swims against the stream, to meet rather than pursue the fish it preys upon—in lakes, destroys more than it devours, and spoils a pond in a few nights—tears to pieces the nets of the fishers—two different methods of fishing practised by it—infests the edges of lakes with the dead fish it leaves—often distressed for provision

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in winter, when lakes are frozen, and then obliged to live upon grafs, weeds, and bark of trees—its retreat the hollow of a bank made by the water—there it forms a gallery several yards along the water—how it evades the fowler—time of coupling—description of its habitation—way of training it up to hunt fish, and, at the word of command, drive them up to the corner of a pond, seize the largest, and bring it in its mouth to its master—to take an old otter alive not easy—few dogs dare to encounter it—marks of its residence—bites with great fierceness, and never lets go its hold—brings forth its young under hollow banks upon beds of rushes, flags, or weeds—manner of taking the young alive—how fed when taken—continues long without food—couples about midsummer in Europe, and brings forth at nine weeks end, three or four at a time—some dogs trained up to discover its retreat—otters met with in most parts of the world—in North America and Carolina found white, inclining to yellow—description of the Brazilian otter, iv. 139 to 146.

Ovaria, two glandular bodies near the womb, resembling the cluster of small eggs found in fowls, ii. 15.

Quarine species of monkeys so called by Mr. Buffon, remarkable for the loudness of their voice, and the use to which they apply it, iv. 212.

Oviparous animals, distinguished from the viviparous, the two classes for generation; all other modes held imaginary and erroneous, ii. 20.

Ourang-outang, the wild man of the wood, an animal nearly approaching the human race, is the foremost of the ape-kind—this name given to various animals walking upright; but of different countries, proportions and powers—the troglodyte of Bontius, the drill of Purchas, and the pigmy of Tyson have received this general name—its description in a comparative view with man—gigantic races of it described by travellers truly formidable—many are

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taller than man, active, strong, intrepid, cunning, lascivious, and cruel—countries where found—in Borneo the quality course him as we do the stag, and this hunting is a favourite amusement of the king—runs with great celerity—its description—Battel calls him pongo; assures us that in all he resembles man, but is larger to a gigantic state—a native of the tropical climates—he lives upon fruits, and is not carnivorous—goes in companies; and this troop meeting one of the human species without succour, shew him no mercy—they jointly attack the elephant, beat him with clubs, and force him to leave that part of the forest they claim as their own—is so strong, that ten men are not a match for it—none of the kind taken but very young—one of them dying, the rest cover the body with leaves and branches—a negro boy taken by one of these, and carried into the woods, continued there a whole year without any injury—they often attempt the female negroes going into the woods, and keep them against their wills for their company, feeding them plentifully all the time—a traveller assures us, that he knew a woman of Loango that lived among them for three years—they build sheds, and use clubs for their defence—sometimes walk upright, and sometimes upon all fours, when phantastically disposed—though it resembles man in form, and imitates his actions, it is inferior in sagacity even to the elephant or the beaver—two of these creatures brought to Europe discovered an astonishing power of imitation, sat at table like men, ate of every thing without distinction, made use of knife, fork, and spoon, drank wine and other liquors—the male of these two creatures being sea-sick, was twice bled in the arm; and afterwards, when out of order, he shewed his arm as desirous of relief by bleeding—another was surprisingly well behaved, drank wine moderately, and gladly left it for milk or other sweet liquors—it had a defluxion upon the breast

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breast, which encreasing caused its death in the space of one year from its arrival, iv. 177 to 191.

Ounce, or *onza*, remarkable for being easily tamed, and employed all over the East for the purposes of hunting, iii. 79—distinguished from the panther, the *onca* of Linnæus, 236—one at present in the Tower of London, with which the keeper plays without the smallest apprehension, 240—does not pursue by the smell like the dog-kind—manner of hunting with it, 242—the hyena attacks it, and seldom fails to conquer, 318.

Owl, description of the common horned-owl—the skreech-owl, and its distinctive marks, v. 78—common mark by which all birds of this kind are distinguished from others—general characteristics of birds of the owl-kind—though dazzled by a bright day-light, they do not see best in darkest nights, as imagined—seasons in which they see best—nights of moon-light the times of their successful plunder—seeing in the night, or being dazzled by day, not alike in every species of this kind—instances in the white, or barn-owl, and in the brown horn-owl—description of the great horned-owl—names of several owls without horns—these horns nothing more than two or three feathers that stand up on each side of the head over the ear—times of making their excursions—places where found in the day-time—father Kircher having set the voices of birds to music, has given all the tones of the owl note, which make a most tremendous melody—sometimes bewildered—what they do in that distress—aversion of small birds to the owl—how they injure and torment him in the day-time—an owl appearing by day sets a whole grove into an uproar—small birds sometimes hunt the owl until evening, when recovering sight, he makes the foremost pay dear for their sport, and does not always leave man an unconcerned spectator—sport of bird-catchers, by counterfeiting the cry of the owl—in what manner the great horned-owl is used by falconers to lure

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the kite, when wanted for training the falcon—places where the great horned-owl breeds—its nest, and number of eggs—the lesser owl takes by force the nest of some other bird—number of eggs—the other owls build near the place where they chiefly prey—a single owl more serviceable than six cats, in ridding a barn of mice—an army of mice devoured at Hallontide by a number of strange painted owls—are shy of man, extremely untractable, and difficult to tame—the white owl in captivity refuses all nourishment, and dies of hunger—account of Mr. Buffon to this purpose, v. 123 to 134.

Ox, its eyes are brown, ii. 76—on the fertile plains of India it grows to a size four times as large as the same kind bred in the Alps, 219—one in England sixteen hands high; its growth depends on the richness of pasture, iii. 12.

Oxney, an island near Romney marsh, in what manner produced, i. 257.

Oysters, a horse known to be fond of oysters, ii. 301—surprising manner in which monkies manage an oyster, iv. 213—bivalved shell-fish, are self-impregnated—the particulars in which they differ from the muscle—growing even amidst branches of the forest—have no other seeming food than the afflux of sea-water—they are deposited in beds where the tide comes in, at Colchester, and other places of the kingdom—these said to be better tasted—amazing size of oysters along the coast of Coromandel, vii. 44 to 47—the pearl oyster has a large whitish shell, the internal coat of which is the mother-of-pearl, 51.

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Paca, improperly called American rabbit, an animal of South America—its cry, and manner of eating—is most like the agouti, yet differs in several particulars—its description—places where generally found—

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found—its flesh considered a delicacy, and eaten, skin and all, like a young pig—is seldom taken alive, defending itself to the last extremity—persecuted not only by man, but by every beast and bird of prey—breeds in such numbers, the diminution is not perceptible, iv. 50 to 52.

Pachomac deserts, where the formidable bird condor is chiefly seen, men seldom venture to travel; hissing serpents, and prowling panthers, being the scattered inhabitants, v. 95.

Pacific sea, the winds never change in it, i. 317.

Pacos, a kind of camel in South America—its wool very valuable, iv. 293.

Paddock-moon, the silence of frogs in dry weather, may serve to explain an opinion, that there is a month in the year so called, in which they never croak, vii. 80.

Pain, nothing but repeated experience shews how seldom pain can be suffered to the utmost, ii. 192.

Painters never fully imitate that bold relieve, which both eyes give to the object, ii. 137.

Paleness often the effect of anger, and almost ever the attendant of fright and fear, ii. 85.

Palm-tree, its juice drank by the rousette, or the great bat of Madagascar, iv. 133—the elephant eats the shoots, leaves, and branches, to the stump, 242.

Pambamarca, mountain at Quito in Peru—a very uncommon meteor seen upon it by Ulloa, i. 357.

Pangolin, vulgarly the scaly lizard, is a native of the torrid climates of the ancient continent—of all animals, the best protected from external injury—its description—at the approach of an enemy, it rolls itself up like the hedge-hog—the tiger, panther, and hyena make vain attempts to force this animal, when it rolls itself up like the hedge-hog—its flesh is considered by the negroes of Africa as a great delicacy—it has no teeth—lives entirely upon insects—there is not a more harmless, inoffensive creature

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than this, unmolested—cunning in hunting for its prey—chiefly keeps in the obscure parts of the forests—its tongue, when extended, is shot out above a quarter of a yard beyond the tip of the nose—countries where found, iv. 111 to 116.

Panther, it naturally hunts the sheep and the goat, ii. 294—the foremost of the mischievous spotted kind, by many naturalists mistaken for the tiger—the panther of Senegal—the large panther—difference between these two—that of America, or jaguar, compared with the two former, iii. 231 to 234—sometimes employed in hunting—the gazelle, or leveret, are its prey—it sometimes attacks its employer, 241—attends to the call of the jackall, 312.

Pappus observes, the most convenient figures in buildings are hexagons, cells of bees are perfect hexagons, viii. 10.

Par, a peasant, lived to a hundred and forty-four, without being abstemious, ii. 186.

Paradise-bird, few have more deceived and puzzled the learned than this—it is an inhabitant of the Molucca islands—erroneous reports concerning this bird, and what has given rise to them—the native savages of those islands carefully cut off its legs before they bring it to market, and why—two kinds of the bird of Paradise—their distinction from other birds—the description of this bird—found in great numbers in the island of Aro, where the inhabitants call it God's bird—live in large flocks, and at night perch upon the same tree—are called by some the swallows of Ternate, and, like them, have their stated times of return—their king distinguished from the rest by the lustre of his plumage, and the respect and veneration paid to him—killing the king, the best chance of getting the flock—chief mark to know the king, is by the ends of the feathers in the tail, having eyes like those of the peacock—a number of these birds taken, the method is to gut them, cut off their legs, dry the
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internal moisture with a hot iron, and fill the cavity with salt and spices, then sell them to the Europeans for a mere trifle—how this bird breeds, or what the number of its young, remains for discovery—for beauty, it exceeds all others of the pie kind, v. 227 to 231.

Parakeets, a kind of parrot of a lesser size, v. 240—of that kind in Brasil, Labat assures us, there are the most beautiful in plumage, and the most talkative birds in nature, 248. See *Parrot*.

Parana, a river in South America, wherewith, at eight hundred leagues from its source, the Plata runs to its mouth, i. 201.

Parafina, name given by the Italians to a fishing line, not less than twenty miles long—baited with ten or twelve thousand hooks, and sunk to the bottom along the coast in the Mediterranean, for that fishing called the *pielago*, vi. 233.

Parasite plants, not able to support themselves, grow and fix upon some neighbouring tree, ii. 9.

Parrot, the middle or second size of the kind, described—the ease with which this bird is taught to speak, and the number of words it is capable of speaking, are surprising—a grave writer affirms, that one of these was taught to repeat a whole sonnet from Petrarch—the author has seen one taught to pronounce the ninth commandment articulately—account of a parrot belonging to king Henry VII. which fell into the Thames, crying, *A boat, twenty pound for a boat*—Linnæus makes its varieties amount to forty-seven; Brisson extends his catalogue to ninety-five; and the author thinks them numberless—assertion, that the natives of Brasil by art change the colour of a parrot's plumage—peculiarities observed in their conformation—common enough in Europe; will not, however, breed here—loses spirits and appetite during the rigour of winter—instances of sagacity and docility, particularly of the great parrot, called *aicurus*—their habits—

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habits—their nests, and the number of eggs—usual method of taking the young—always speak best, when not accustomed to harsh wild notes—what fruit or grain these birds feed upon, their flesh partakes of the flavour and taste—instances of it—seed of the cotton-tree intoxicates them, as wine does man—wine renders them more talkative and amusing—in France very expert, but nothing to those of Brasil, which Clusius says are most sensible and cunning—natives of Brasil shoot them with heavy arrows, headed with cotton, which knock down the bird without killing it—those of the parakeet tribe are delicate eating—of this kind in Brasil, Labat assures there are the most beautiful in plumage, and the most talkative possible—are restless, and ever on the wing—their habits—their outcry when their companions fall—are very destructive on the coast of Guinea—more than a hundred different kinds counted on the coast of Africa—the white sort called lories—countries where found—one, north of the Cape of Good Hope, takes its name from the multitude of parrots in its woods—a hundred kinds now known, not one of which naturally breeds in countries that acknowledged the Roman power—the green parakeet, with a red neck, was the first of the kind brought into Europe, and the only one known to the ancients, from Alexander the Great to Nero—disorders peculiar to the parrot kind—one well kept will live five or six and twenty years, v. 238 to 251.

Parsley, pinks, and birch, hares are particularly fond of, iv. 7.

Partridges, in England, a favourite delicacy at the tables of the rich, whose desire of keeping them to themselves has been gratified with laws for their preservation, no way harmonizing with the general spirit of English legislation, and why—there are two kinds, the grey and the red; the grey is most prolific, and always keep on the ground; the red less common, and perches upon trees—the partridge

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tridge is found in every country and climate—in Greenland, where it is brown in summer, becomes white in winter—those of Barakonda are larger legged, swifter of foot, and reside in the highest rocks—partridges of all sorts agree in one character, being immoderately addicted to venery; often to an unnatural degree—the male pursues the hen to her nest, and breaks her eggs, rather than be disappointed—the young having kept in flocks during the winter, break society in spring, when they begin to pair; and terrible combats ensue—their manners otherwise resemble those of poultry, but their cunning and instincts are superior—means the female uses to draw away any formidable animal that approaches her nest—the covies from ten to fifteen, and, unmolested, they live from fifteen to seventeen years—method of taking them in a net with a setting-dog, the most pleasant, and most secure—they are never so tame as our domestic poultry, v. 183. to 187.

Passions, most of the furious sort characterized from the elevation and depression of the eye-brows, ii. 77—freedom from passions not only adds to the happiness of the mind, but preserves the beauty of the face, 182.

Pastures, those of Great Britain excellently adapted to quadrupedes of the cow kind, iii. 9.

Patas, by some called the red African monkey—its description, iv. 218.

Paul, (St.) in Lower Brittany. See *Sand*, i. 339.

Paunch, name of the first stomach of ruminating animals, iii. 3.

Paxan, name of the eighth variety of gazelles, by Mr. Buffon, iii. 69.

Peacock, a saying among the ancients, as beautiful as is the peacock among birds, so is the tiger among quadrupedes, iii. 215—varieties of this bird—some white, others crested—that of Thibet, the most beautiful of the feathered creation—our first were brought

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brought from the East Indies; and they are still found in flocks in a wild state in the islands of Java and Ceylon—the common people of Italy say it has the plumage of an angel, the voice of a devil, and the guts of a thief—in the days of Solomon, we find his navies imported from the East apes and peacocks—Ælian relates, they were brought into Greece from some barbarous country; and that a male and female were valued at thirty pounds of our money—it is said also, that when Alexander was in India, he saw them flying wild on the banks of the river Hyarotis, and was so struck with their beauty, that he laid a fine and punishment on all who should kill or disturb them—the Greeks were so much taken with the beauty of this bird, when first brought among them, that it was shewn for money; and many came to Athens from Lacedæmon and Thessaly to see it—once esteemed a delicacy at the tables of the rich and great—Aufidius Hurco stands charged by Pliny with being the first who fatted up the peacock for the feasts of the luxurious—Hortensius the orator was the first who served them up at an entertainment at Rome; and they are talked of as the first of viands—in the times of Francis I. it was a custom to serve up peacocks to the tables of the great, not to be eaten, but seen; in what manner they served them—its flesh is said to keep longer unputrefied than any other—has a predilection for barley; but, as a proud and fickle bird, there is scarce any food it will at all times like—it strips the tops of houses of tiles or thatch, lays waste the labours of the gardener, roots up the choicest seeds, and nips favourite flowers in the bud—is still more salacious than the cock—requires five females at least to attend him; and the number not sufficient, will run upon and tread the sitting hen—the peahen, as much as possible, hides her nest from him, that he may not disturb her sitting—she seldom lays above five or six eggs in this climate—Aristotle describes her laying twelve—in forests where they

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they breed naturally, they are very numerous—this bird lives about twenty years; and not till the third year has that beautiful variegated plumage of its tail—in the kingdom of Cambaya, says Taverner, near the city of Baroch, whole flocks of them are in the fields—description of their habits—decoy made use of to catch them there, v. 153 to 158.

Peacock, (sea) a name given, and by which has been described, the Balearic crane, from some resemblance in disposition and manners, v. 346.

Peak, a noted mountain in the Molucca islands, seen far off at sea, swallowed by an earthquake, and a lake left where it stood, i. 150.

Peak of Teneriffe, a volcano, i. 92.

Pearl, an animal substance concreted and taking a tincture from the air—found in all bivalved shells, the inside of which resemble that substance called mother-of-pearl—the formation of pearls a disease or an accident in the animal, is not known—common opinion upon this subject—the pearl bred from no disorder in the animal—*pearl-oyster*, from which the mother-of-pearl is taken—several pearl fisheries—the chief of them in the Persian Gulph, and the most valuable of pearls brought from thence—different sizes, figures, and colours—whence their different colours proceed—pearls converted by time and damps into a chalky powder—wretched people destined to fish for pearls—usually die consumptive—in what manner they fish for them, vii. 45 to 55.

Pearls, in stags, are parts rising from the crust of the beam, iii. 105.

Peasants, the meanest of them in Germany, Poland, and Switzerland kills a cow for his own table, salts and hangs up, and preserves it as a delicacy all the year round, iii. 8.

Peccary, or *tajacu*, an animal a native of America, at first view resembling a small hog—its description—

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tion—has upon the back a lump like the navel in other animals—it consists of glands producing a liquor of an offensive smell—when killed, the parts of geueration, and the glands on the back, must be taken instantly away, otherwise in half an hour the flesh becomes unfit to be eaten—though like the hog in many respects, is nevertheless a distinct race, and will not mix nor produce an intermediate race—is easily tamed—goes in herds of two or three hundred, and unites, like hogs, in each other's defence—delights not in marshes or mud, like our hogs—an unceasing enemy to the lizard, the toad, and the serpent kinds—also feeds upon toads and serpents—any plunderer seizing their young, is surrounded, and often killed, iii. 169 to 175.

Pedigree, the Arabians preserve that of their best horses with great care, and for several generations back, ii. 321.

Pegu, a river called the Indian Nile, because of the similar overflowings of its stream, i. 203.

Pelagii, the Latin name for those shells fished up from the deep—those cast on the shore are the littorales, vii. 12.

Pelican, a ruminating bird, iii. 5—a native of Africa and America; once known in Europe, particularly in Russia—fabulous accounts propagated of it—the description of it, particularly of its bill, and the great pouch underneath, as wonderful—Tertre affirms the pouch will hide flesh enough to serve sixty hungry men for a meal—this pouch placed at the top of the gullet, considered as the crop in other birds—the description of the bird, from father Labat—indolent habits in preparing for incubation, and defending their young—their gluttony scarcely to be satisfied; their flesh rancid, and tastes worse than it smells—use made by the Americans of their pouches—is not entirely incapable of instruction in a domestic state—instances of it—Aldrovandus mentions

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mentions one believed to be fifty years old, vi. 46 to 54.

Penguin, union between this bird and the albatross, and regularity in their building together, vi. 57—a heavy water-fowl—the wings of this tribe unfit for flight; and their legs still more awkwardly adapted for walking—our sailors call them arse-feet—they dive to the bottom, or swim between two waters—they never visit land, but when coming to breed—their colour—are covered more warmly with feathers than other birds—description of the Magellanic penguin—they unite in them the qualities of men, fowls, and fishes—instances of its gluttonous appetite—their food and flesh—are a bird of society—season of laying, and manner of making their nests—some of this tribe called by our seamen the booby—our men first coming among them, were not distrusted nor avoided; they stood to be shot at in flocks, till every one was destroyed—the females let them take their eggs without any resistance—the penguin lays but one egg—in frequented shores—burrows like a rabbit—three or four take possession of one hole, and hatch—one is placed as a sentinel to warn of approaching danger, vi. 81 to 88.

Peninsula of India, on one side the coasts are near half the year harrassed by violent hurricanes and northern tempests, i. 324—the people there employ the elephant chiefly in carrying or drawing burthens, iv. 260.

Penpark-hole, in Gloucestershire, twenty-five fathom perpendicular depth—its description, from captain Sturmev, i. 61.

People, so young as fourteen or fifteen often found to cease growing, ii. 72.

Pepper, the Indians prefer that devoured and voided unconcocted by the toucan, before the pepper fresh gathered from the tree, v. 216.

Perch,

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Perch, a prickly-finned thoracic fish—its description, vi. 280.

Perfumes, some physicians think all perfumes unwholesome—our delight in perfumes seems made by habit, ii. 166—many bodies at a distance give an agreeable perfume, and nearer have a most ungrateful odour, 167—no perfume has a stronger or more permanent smell than musk, iii. 82—the scent of the martin a most pleasing perfume, 340—some of the weasel kind have a smell approaching to perfume, 353—that of the musk or the civet, is nothing to the odour of the flinkards, 355—in what manner taken from the pouch—more grateful perfume than musk—that of Amsterdam the purest of any—is communicated to all parts of the animal's body; the fur impregnated, and the skin also—a person shut up with one of the skins in a close room, cannot support the scent—this perfume sold in Holland for about fifteen shillings an ounce—it has no analogy with the creature's appetite for generation—a proof of it—has its vicissitudes of fashion, like dress, 363 to 366.

Persepolis, pastures in the plains about that place excellent for the purposes of rearing horses, ii. 332.

Persia, snow falls in abundance upon its mountains, i. 334—the horses of that country the most beautiful and most valuable of all in the East, ii. 332—there are studs of ten thousand white mares together, with the hoof so hard that shoeing is unnecessary, 326—description of the Persian horses by Pietro della Valle, 332—the flesh of the wild ass so much liked that its delicacy is a proverb there, 347—an entertainment of wild asses exhibited by the monarch to Olearius, 346—two kinds of asses there, and some of them worth forty or fifty pounds, 354—a noted country for giving long soft hair to the animals bred in it, iii. 196—lions found to diminish in number in this country, 199—the bird of Persia is the common cock of Aristophanes, v. 144.

Persian

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Persian Gulph, a very dangerous wind prevails, by the natives called the sameyel—it suddenly kills those it involves in its passage, and frequently assumes a visible form, darting in a blueish vapour along the surface of the country—the poets of Persia and Arabia have described it as under the conduct of vengeance, who governs its terrors, and raises or depresses it, as he thinks proper, i. 334 — the chief pearl fishery carried on there, vii. 52 — that gulph choaked up in many places with coralline substances, viii. 121.

Persian kings, wore their whiskers matted with gold thread, ii. 88.

Persians admire large eye-brows, joining in the middle, ii. 70. — divided into two classes, tyrants and slaves, vii. 54.

Perpiration, an experiment from which the learned may infer upon what foundation the doctrine of Sanctorian perpiration is built, ii. 101, 102.

Peruvians, father Acosta, and Garcilasso de la Vega, make no doubt but that they understood the art of preserving their dead for a long space of time, ii. 250.

Peter the Great, czar of Russia, celebrated a marriage of dwarfs—the preparations for this wedding were grand, yet executed in a style of barbarous ridicule, ii. 231.

Petreoleum, an injection of this bituminous oil inwardly, and an application of asphaltum without, suffice to make a mummy, ii. 263.

Pettichaps, a bird of the sparrow kind, v. 279.

Phalanger, a kind of opossum—its description—has been called the rat of Surinam, iv. 232.

Pharaoh, (the cat of) name given to the ichneumon, iii. 348.

Pharaoh, (the capon of) thought to be the true ibis—a devourer of serpents, and will follow the caravans to Mecca, to feed upon the offal of animals killed on the journey, v. 343.

Phasis,

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Phasis, a river of Colchis, in Asia Minor, from the banks of which the pheasants were brought into Europe, and still retain their name, v. 164.

Phatagin, an animal less than the pangolin—the extent of its tail above twice the length of its body—countries where it is to be found, iv. 116.

Pheasants, at first propagated among us, brought into Europe from the banks of the Phasis, a river of Colchis, in Asia Minor, whence they still retain their name—Croesus, king of Lydia, seated on his throne, adorned with the barbarous pomp of eastern splendour, asked Solon whether he ever beheld any thing so fine? Solon replied, that having seen the beautiful plumage of the pheasant, no other finery could astonish him—description of this beautiful bird—its flesh the greatest dainty—animals of the domestic kind, once reclaimed, still continue domestic, and persevere in the habits and appetites of willing slavery; but the pheasant, taken from its native warm retreats, still continues his attachment to native freedom; and wild among us, is an envied ornament of our parks and forests, where he feeds upon acorns and berries—in the woods the hen pheasant lays from eighteen to twenty eggs in a season; but in a domestic state seldom above ten—when wild, she hatches and leads up her brood with patience, vigilance, and courage; but when tame she never sits well; and a common hen becomes her substitute; and for leading her young to their food, she is utterly ignorant where it is found—and the young would starve if left solely to her management—it is better left at large in the woods than reduced to its pristine captivity—its fecundity, when wild, is sufficient to stock the forest, and its flesh acquires a higher flavour from its unlimited freedom—its habits, when tame—no birds are shot more easily—when physicians of old spoke of wholesomeness of viands, the comparison lay with the flesh of the pheasant—these birds taken young into keeping, become as familiar as chickens; and when designed
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for breeding, they are put together in a yard, five hens to a cock—their nest in its natural state—the female refusing to hatch the eggs, a common hen supplies her place, and performs the task with perseverance and success—the young difficult to be reared—with what food the young must be supplied—particularities concerning the rearing of the young ones—the method of Longolius, to encrease the breed and make it more valuable—the pheasant will at last be brought to couple with a common hen—many varieties of pheasants; of all others, the *golden pheasant* of China the most beautiful, v. 164 to 170.

Phlegium, highest mountains in Ethiopia, swallowed by an earthquake, i. 150.

Pholades, the file-fish, places where these animals are found—their power of penetrating—the pillars of the temple of Serapis at Puteoli were penetrated by them—they pierce the hardest bodies with their tongue—their motion slow beyond conception—have no other food but the sea-water—are accounted a great delicacy, vii. 60 to 64.

Pichincha, a remarkable mountain, near Quito, in South America, i. 140.

Pie, in the class of the pie kind, few, except the pigeon, are of use to man; yet, to each other, no class of birds so ingenious, active, and well-fitted for society—they live in pairs, and their attachments are confined to each other—they build nests in trees or bushes; the male shares in the labour of building, and relieves his mate in the duties of incubation; and the young once excluded, both are equally active in making them ample provision—general laws prevail, and a republican form of government is established among them—they watch for the general safety of every bird of the grove—they are remarkable for instinct and capacity for instruction—instances of it, fetching and carrying untaught, all this tribe are but too fond of—their passion for shining things, and such toys as some of

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us put a value upon—rings found in the nest of a tame magpie—the few general characters in which they all agree, v. 194 to 197.

Pie, (sea) breeds in this country, and resides in its marshy parts, vi. 26.

Pigeons, bred to a feather, means a display of art by those persons who employ themselves in rearing pigeons of different colours, ii. 228—are ruminating birds, iii. 5—those that live in a wild state by no means so fruitful as those in our pigeon-houses nearer home—the tame pigeon, and all its beautiful varieties, owe their origin to one species, the stock-dove—colours of the pigeon in a state of nature—the dove-house pigeon breeds every month—the hatching of its eggs—a full explanation of the method of feeding their young from the crop—various names of tame pigeons—attempts made to render domestic the ring-dove, but hitherto fruitless—the turtle-dove a bird of passage—a pair put in a cage, and one dying, the other does not survive—the pigeon called *ocotzimtzan* is one of the splendid tenants of the Mexican forests—pigeons of the dove-house not so faithful as the turtle-dove—two males quarrel for the same mistress; and when the female admits the addresses of a new gallant, her old companion bears the contempt with marks of displeasure, abstains from her company, or when he approaches is sure to chastise her—instances of two males displeased with their mates, who have made an exchange, and lived in harmony with their new companions—near fifteen thousand pigeons may in four years be produced from a single pair—the stock-dove seldom breeds above twice a year—have a stronger attachment to their young than those who breed so often—the pigeons called carriers used to convey letters, not trained with as much care as formerly, when sent from a besieged city to those coming to relieve it—in an hour and a half, they perform a journey of forty miles—the only use now made

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made of them is to be let off at the place of execution, when the cart is drawn away, v. 252 to 261.

Pigmy, existence of a pigmy race of mankind founded in error or in fable, ii. 230.

Pigtail is the last of the baboons—Mr. Buffon calls it maimon—its description—is a native of Sumatra, not well enduring the rigours of our climate, iv. 202.

Pike, the description of this fish, vi. 285—poets have called it the tyrant of the watery plain—instances of their rapacity, 314, *et seq.*

Pilchards, little differing from the herring—make the coast of Cornwall their place of resort—the natives sometimes enclose a bay of several miles extent with nets called faines—how directed, some years ago, to know where to extend the nets—they take twelve or fifteen hundred barrels of pilchards at a draught—serve also for manure—advantages of this fishery—money paid for pilchards exported has annually amounted to near fifty thousand pounds, vi. 302 to 304.

Pillau, on the Baltic, the shores near that place divided into districts for the sturgeon fishery, and allotted to companies of fishermen, who rent some of them at three hundred pounds a year, vi. 253.

Pills, of calcined shells and tobacco, used by the American Indians undertaking long journies, to palliate hunger, ii. 122.

Pilori, one of the three distinctions of the musk-rat—it is a native of the West-India islands, iv. 73.

Pilot of the shark, name given the sucking-fish or remora, and why, vi. 222.

Pinch, name of a monkey of the sagoïn-kind—its description, iv. 222.

Pinks, hares are particularly fond of them as of parsley and birch, iv. 7.

Pintada, or the Guinea hen, its description—different names given to this bird—its habits—the eggs are speckled, v. 171.

Pintail,

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- Pintail*, a kind of duck has the two middle feathers of the tail three inches longer than the rest, vi. 116.
- Pipal*, the Surinam toad, an extraordinary and hideous creature—its description—the young bred and hatched on its back, vii. 98, *et seq.*
- Pipe* of the shepherd, the stag seems delighted with its sound, iii. 97.
- Pipe-fish*, cartilaginous and not thicker than a swan-quill—its description, vi. 262.
- Pipes*, conducting water, upon what principle they depend, i. 172—why those in London are extremely apt to burst, 173.
- Pipe-worms*, and other little animals, fix their habitations to the oyster's sides, and live in security, vii. 45.
- Pit-falls*, a wolf, a friar, and a woman taken in one, all in the same night—the woman lost her senses, the friar his reputation, and the wolf his life, iii. 295.
- Pithekos*, name given by the ancients to the ape properly so called, iv. 193.
- Pivot*, the razor shell, its motion and habits—is allured by salt, vii. 48, 49.
- Placenta*, the burden, or that body by which the animal is supplied with nourishment, ii. 37, 38.
- Plague*, not well known whence it has beginning—is propagated by infection—some countries, even in the midst of Africa, never infected with it—others generally visited by it once a year, as Egypt—not known in Nigritia—Numidia it molests not once in a hundred years—plague spread over the world in 1346, after two years travelling from the great kingdom of Cathay, north of China, to Europe—the plague desolated the city of London in 1665—its contagious steams produced spots on the walls—for this last age it has abated its violence even in those countries where most common, and why—a plague affected trees and stones, i. 306 to 308.

Plaisir

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Plaisne en Anjou, a village in France, particular account of a dwarf born there, ii. 234.

Plaster of Paris finely powdered boils and heaves in great waves, like water, i. 168.

Planets, some of them exceed the earth a thousand times in magnitude—at first supposed to wander in the heavens without fixed paths—perform their circuits with great exactness and strict regularity, i. 3.—lesser planets attendants upon some of the greater, 4.

Plantane, preferred by the ass to every other vegetable, ii. 350.

Plants and vegetables, will not grow so fast in distilled as undistilled water, i. 155—smell of some so powerful as hardly to be endured, 204—plants, submarine, corals, and other vegetables, covering the bottom of the sea, 269—do not vegetate in an exhausted receiver, 294—but thus ceasing to vegetate, keep longer sweet than when exposed to external air, 295—their juices rarefied principally by the sun, to give an escape to their imprisoned air, 315—a certain plant in Ireland so strongly affected the person who beat it in a mortar, and the physician present, that their hands and faces swelled to an enormous size, and continued tumid for some time after, 305—compared with animals, similitude—how assimilated in different climates and soils, ii. 3 to 7—the sensitive, that moves at the touch, has as much perception as the fresh-water polypus, possessed of a still slower share of motion, 3—many plants propagated from the deposition of birds, v. 281. See *Caraguata*. See *Parasite*.

Plate, or *Plata*, a great river in South America—its source and length, i. 201—receives above fifty rivers, 203.

Platina, or white gold, the most obstinate of all substances, i. 69.

Pluers en Champagne, a town in France, buried beneath a rocky mountain, i. 147.

Pliny,

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- Pliny*, in his arrangements different from the present, placed the bats among birds, iv. 126.
- Plomonecles*, the flumide, description of this fish, vi. 284.
- Plover*, the green and grey, are birds of passage—the Norfolk plover—season of courtship, vi. 25 to 28.
- Plumage* of the king-fisher preserves its lustre longer than any other, vi. 132.
- Pochard*, a kind of duck, vi. 116.
- Poetry*, our ancestors excelled us in the poetic arts, as they had the first rising of all the striking images of nature, ii. 244.
- Pointer*, a kind of dog, iii. 264.
- Poison*, the most deadly poisons are often of great use in medicine, ii. 12 — fishes often live and subsist upon such substances as are poisonous to the more perfect classes of animated nature—that numbers of fishes inflict poisonous wounds, in the opinion of many, cannot be doubted, vi. 319—the many speculations and conjectures to which this poisonous quality in some fishes has given rise, 319—some crabs found poisonous, 342—the seat where the poison in venomous serpents, vii. 178—the serpent poison may be taken inwardly, without any sensible effects, or any prejudice to the constitution—an instance of it—if milk be ejected into a vein, it will kill with more certain destruction than even the poison of the viper, vii. 182 to 184. See *Fireflare*. See *New Providence*.
- Polar* regions, description of them, i. 10, 11 — and of the inhabitants round them, ii. 196.
- Pole-cat*, a distinct species from the ermine, iii. 331—resembles the ferret so much, that some have thought them the same animal—there are many distinctions between them—warreners assert the pole-cat will mix with the ferret—Mr. Buffon denies it—description of the pole-cat—very destructive to young game—the

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the rabbit its favourite prey; and one pole-cat destroys a whole warren by a wound hardly perceptible—generally reside in woods or thick brakes, making holes two yards deep under ground—in winter, they rob the hen-roost and the dairy—particularly destructive among pigeons—and feast upon their brains—fond also of honey—female brings forth in summer five or six young at a time, and supplies the want of milk with the blood of such animals as she can seize—the fur is in less estimation than of inferior kinds, and why—an inhabitant of temperate climates, being afraid of cold as well as heat—the species confined in Europe to a range from Poland to Italy, iii. 336 to 340—pole-cat of America and Virginia are names for the squash and the skink—distinctions of those animals, 353—seizes the flying squirrel, iv. 35.

Poles, trade-winds continually blow from them towards the equator, i. 320—the winter beginning round the poles, the same misty appearance produced in the southern climates by heat, is there produced by cold—the sea smokes like an oven there—limbs of the inhabitants of those regions, sometimes frozen and drop off, 360—as we approach the north pole the size of the natives proportionably diminishes, growing less and less as we advance higher—the strength of the natives round the polar regions is not less amazing than their patience in hunger, ii. 200.

Polynemus, description of this fish, vi. 282.

Polypus, very voracious—its description—uses its arms as a fisherman his net—is not of the vegetable tribe but a real animal—examined with a microscope, several little specks are seen like buds, that pullulate from different parts of the body, and these soon appear to be young polypi, beginning to cast their little arms about for prey; the same food is digested, and serves for nourishment of both—every polypus has a colony sprouting from its body; and these new ones, even while attached to the parent, become parents themselves, with a smaller colony also budding

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budding from them—though cut into thousands of parts, each still retains its vivacious quality, and shortly becomes a distinct and complete polypus, fit to reproduce upon cutting in pieces—it hunts for its food, and possesses a power of chusing it or retreating from danger, ii. 21 to 23—dimensions of the sea-polypus, and of that which grows in fresh-waters—the power of dissection first tried upon these animals to multiply their numbers—Mr. Trembley has the honour of the first discovery of the amazing properties and powers of this animal—this class of animals divided into four different kinds—method of conceiving a just idea of their figure—manner of lengthening or contracting itself—progressive motion—an appearance of an organ of sight found over the whole body—inclined to turn towards the light—their way of living—arms serve them as lime-twigs do a fowler—how it seizes upon its prey—testifies its hunger by opening its mouth—having seized the prey, opens its mouth in proportion to the size of what it would swallow, whether fish, flesh, or insects—when two mouths are joined upon one common prey, the largest swallows his antagonist; but after laying in the conqueror's body for about an hour, it issues unhurt, and often in possession of the prey of contention—the cold approaching to congelation, they feel the general torpor of nature, and their faculties are for two or three months suspended—such as are best supplied soonest acquire their largest size, but they diminish also in their growth with the same facility, if their food be lessened—some propagated from eggs; some produced by buds issuing from the body as plants by inoculation; while all may be multiplied by cuttings to an amazing degree of minuteness—of those produced by buds issuing from the parent stem, should the parent swallow a red worm, it gives a tincture to all its fluids, and the young partakes of the parental colour; but if the latter should seize upon the same prey, the parent is no way benefitted by the capture, all the advantage thus remains with the young—
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several young of different sizes are growing from its body; some just budding forth, others acquiring perfect form, and others ready to drop from the original stem; those young, still attached to the parent, bud and propagate also, each holding dependence upon its parent—artificial method of propagating these animals by cuttings—Mr. Hughes describes a species of this animal, but mistakes its nature, and calls it a sensitive flowering plant, viii. 109 to 120.

Polypus-coral, the work of an infinite number of reptiles of that kind, viii. 123—in every coralline substance are a number of polypi, 125.

Pomerania, a large part of it covered by the sea, i. 260.

Pongo, name given by Battel to the ouran-outang, iv. 188.

Poppies affect with drowsiness those who walk through fields of them, or are occupied in preparing the flowers for opium, i. 305.

Porcelain, an artificial composition of earth and water, united by heat, i. 154.

Porcupine, as to quills, might be classed among the birds, ii. 287—an enlarged hedge-hog—its description—of all those brought into Europe, not one ever seen to launch its quills, though sufficiently provoked—their manner of defence—directs its quills pointing to the enemy—Kolben relates, the lion then will not venture an attack—feeds on serpents and other reptiles—the porcupine and serpent are said never to meet without a mortal engagement—how it destroys and devours them—of Canada subsists on vegetables—those brought to this country for shew, usually fed on bread, milk, and fruits; do not refuse meat when offered—is extremely hurtful to gardens—the Americans, who hunt it, believe it lives from twelve to fifteen years—during the time of coupling, in the month of September, the males become fierce and dangerous, and often destroy each

other with their teeth—time of gestation—the female brings forth one at a time; she suckles it about a month, and accustoms it to live like herself, upon vegetables and the bark of trees—the female very fierce in the defence of her young; at other seasons, fearful, timid, and harmless—never attempts to bite or any way injure its pursuers—manner of escaping, when hunted by a dog or a wolf—the Indians pursue it to make embroidery with its quills, and eat its flesh—circumstances concerning it remaining to be known—little known with precision, except what offers in a state of captivity—description of one kept in an iron cage—the porcupine of America differs much from that of the ancient continent—two kinds, the couando and the urson—description of both, iv. 101 to 108.

Porcupine of the sea, described, vi. 263.

Pork, unpalatable with us in summer, is the finest eating in warmer latitudes, and preferable to hog's flesh in Europe, ii. 347.

Porpus, or *porpesse*, a fish less than a grampus, with the snout of a hog—its description and habits—a fishery for them along the western isles of Scotland, in the summer season, when they abound on that shore—live to a considerable age, though some say not above twenty-five or thirty years—sleep with the snout above water—possess, proportionably to their bulk, the manners of whales—places where they seek for prey—destroy the nets of fishermen on the coasts of Cornwall—manner of killing them in the Thames—yield a large quantity of oil—the lean, of some not old, said to be as well tasted as veal—caviar prepared from the eggs of this fish, vi. 200 to 206.

Ports choaked up with sand by the vehemence of the wind, i. 325.

Pouch, or bag, of the civet, differs in its opening from that of the rest of the weasel kind—description of it, iii. 362—of the bustard, under the tongue,

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capable of holding near seven quarts of water, v. 175—of the pelican, hides as many fish as will serve sixty hungry men for a meal, vi. 48—its description, 46, 47.

Poultry, general characteristics of the poultry kind—they live together; and each, conscious of his strength, seldom tries a second combat, where he has been once worsted—kept in the same district, or fed in the same yard, they learn the arts of subordination—the young of the kind, not fed with meat put into their mouths, peck their food—the female intent on providing food for her young clutch, and scarce takes any nourishment at all—among the habits of this class of birds, is the peculiarity of dusting themselves—nearly all domestic birds of this kind, maintained in our yards, are of foreign extraction—the courtship of this kind is short, and the congress fortuitous—the male takes no heed of his offspring—though timorous with birds of prey, he is incredibly bold among his own kind; the fight of a male of his own species produces a combat—the female takes all the labour of hatching and bringing up her young, chusing a place remote from the cock, v. 137 to 142.

Powis Land, in Wales, for many ages famous for a swift and generous race of horses, and why, ii. 340.

Powters, a variety of the tame pigeons, v. 259.

Pregnancy of some women found to continue a month beyond the usual time, ii. 43—of all animals, in point of time, is proportioned to their size, 308—in that state no animals, except the hare, receives the male, iv. 5—the duration in the female of the elephant still unknown, 252.

Pressure, perpendicular in rivers, always in exact proportion to the depth, i. 187.

Prey, all the males of these birds are a third less, and weaker than the females, v. 76. See *Birds*.

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- Pricket*, name hunters give the buck the second year, iii. 118.
- Prickley-finned fishes*, their description, vi. 277 to 282.
- Primas*, appellation of a first rate animal—Linnaeus bestows it upon the female of the bat, iv. 129.
- Propagation* of gnats, one of the strangest discoveries in natural history, viii. 89—a new kind lately discovered in a most numerous tribe of animals, propagated by cuttings, 94—different manners of that operation in the polypi, to the astonishment of the learned of Europe, 117.
- Propolis*, a resinous gum, with which the bees plaister the inside of their hives, viii. 11.
- Proportion* of the human figure, little known with precision in regard to it, ii. 97—different opinions upon the subject, 98.
- Prospect*, sketch of a delightful African prospect, on the banks of a most dreadful river, i. 205.
- Provider* of the lion, why the jackall so called, ii. 296
—also why the syagush is called by that name, iii. 246.
- Psalmodi*, in France, an island in 815, now more than six miles from the shore, i. 258.
- Ptarmigan*, sort of grouse, chiefly found in heathy mountains, and piny forests, at a distance from mankind—size and colour, v. 177.
- Pthiriasis*, the lousy disease, frequent among the ancients—principal people who died of this disorder—plants and animals are infested with diseases of this kind—a vegetable louse from America over-run all the physic-garden at Leyden—the leaf-louse described—the males have four wings, the females never have any—when they perceive the ant behind them, they kick back with their hind feet—three principal and constant enemies to these insects, vii. 250 to 255.
- Puffin*, or coulterneb, marks that distinguish this bird—its residence—migrations—found by hundreds, cast

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cast away upon shores, lean and perished with famine—lays one egg—few birds or beasts venture to attack its retreats—in what manner it defends itself against the raven—the manks puffin is itself one of the most terrible invaders—instances of it—places which abound with them—in what manner their young are fed—their food—formerly their flesh was allowed by the church on lenten days—they bite extremely hard, and keep such hold of what they seize, as not easily disengaged—their noise, when taken, very disagreeable, like the efforts of a dumb person attempting to speak—quantity of oil in their bodies, vi. 88 to 96.

Puget, adapted the cornea of a fly in such a position, as to see objects through it by the means of a microscope—strangeness of the representations, vii. 367.

Puma, the American lion; when compared, is much inferior to the American tyger, iii. 214.

Purre, a small bird of the crane kind, with a shorter bill, and thighs bare of feathers, vi. 21.

Puteoli, a city swallowed up by an earthquake, had a temple of Serapis, the pillars of which, while under water, were penetrated by the pholas, or file-fish, vii. 62.

Putrefaction, a new cause of animal life—later discoveries have induced many to doubt whether animal life cannot be produced merely from thence, ii. 20.

Pygmy of Tyfon, the ouran-outang, or the wild man of the wood, iv. 177.

Pyramids of Egypt, one of them entirely built of a kind of free-stone, in which petrified shells are found in great abundance, i. 44.

Pyrard, his account of a kind of apes called baris, which, properly instructed when young, serve as useful domestics, iv. 185.

Pyrites, their composition—sulphur and iron blended and heated with air or water, will form these, and marcasites, i. 71.

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kinds and ages of it—time of shedding its horns—its life seldom longer than twelve or fifteen years; and tame not above six or seven—is of a delicate constitution—easily subdued, but never thoroughly tamed—its cry neither so loud nor so frequent as the stag's—hunters easily imitate the call of the young to the dam, and thus allure her to destruction—this animal contented to flake its thirst with the dew on the grass and leaves of trees—prefers tender branches and buds of trees to corn and other vegetables—we have but two known varieties—the flesh of those between one and two years old the greatest delicacy known—more common in America than in Europe—inhabitants of Louisiana live upon its flesh, which tastes like mutton when well fatted—the breed extremely numerous, and the varieties in proportion—found also in Brasil, where called cuguacuapara; and in China—its describers there confound it with the musk-goat, though of a different nature, iii. 121 to 129.

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Scotland, land in it at one time covered with water, at another free, i. 261—not infested with wolves, iii. 295.

Sea, motion keeps its water sweet, i. 224—open to all nations till the time of the emperor Justinian, i. 217—sensibly retired in many parts of the coasts of France, England, Holland, Germany, and Prussia, 257—Norwegian sea has formed several islands from the main land, and still advances upon the continent, 260—its colour not from any thing floating in it, but from the different reflexions of the rays of light—a proof of it—though its surface be deformed by tempests, it is usually calm and temperate below—the sea grows colder in proportion as divers descend, 272, 273—smokes like an oven near the poles, when the winter begins, 360—no fish imbibe any of the sea-saltiness with food or in respiration—why some species live only there, and expire when brought into fresh water, vi. 292. See *Motion*.

Sea, (Red) choaked up with coralline substances, i. 269—along some shores, and at the mouths of several rivers, the bottom has the appearance of a

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Sea-water, various methods proposed to render it fresh for the use of seamen in long voyages, i. 222—about a forty-fifth part heavier than fresh water, 225—is heavier, and consequently saltier, the nearer we approach the line, 226. See *Salt-water*.

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Seal resembles both a quadrupede in some respects, and a fish in others, ii. 287, and iv. 157—its description—the varieties innumerable—the brain largest of any animal—its tongue differs from other quadrupedes—the foramen ovale in its heart never closing, fits it for continuing under water, though not so long as fishes—the water its habitation, and any fish its food—makes little use of its legs—seldom at a distance from the shore—found in the North and Icy Seas, and on those shores in flocks, basking on the rocks and suckling their young—alarmed, they plunge all together into the water—in thunder and torrents they sport along the shore, as delighted with universal disorder—gregarious and migrant, direct their course to northern coasts and seas free of ice, observing time and track—how and by what passages they return unknown—they go out fat and return lean—females in our climate bring forth in winter—where they rear their young, iv. 157 to 163—how they suckle them—she has four teats—in fifteen days, she brings the young to the water, to swim and get food—no litter exceeds four—the young know the mother's voice among the bleatings of the old—assist each other in danger, and are obedient to her call—hunt and herd together, and have a variety of tones like dogs and cats,

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cats, to pursue prey, or warn of danger—feeling natural desires, they fight desperately, and the victorious male keeps all to himself—two never fall upon one, each has its antagonist—neither length of time in pregnancy, nor duration of these animals lives yet known—two taken young, after ten years had the marks of age—expert at catching fish—destroy herrings by thousands—swift in deep waters, and dive with rapidity—attacked with stones, they bite at what is thrown, and to the last gasp annoy the enemy—time to surprise them—how the Europeans and Greenlanders destroy them—in our climate they are wary, and suffer no approach—never sleep without moving, and seldom more than a minute—taken for their skin and oil—uses of the skin when dressed—the flesh formerly at the tables of the great—an instance of it—the sea-lion, in Anson's Voyage, the largest of the seal family, iv. 164 to 169.

Seeds, some thought to thrive better for maceration in the stomach of birds, before they be voided on the ground, v. 281.

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- Serval*, a native of Malabar, resembling the panther in its spots, iii. 239.
- Setter*, a dog of the generous kind, iii. 264, 267.
- Severn*, lamprey of this river the most delicate of all fish, vi. 244.
- Shagreen*, made of the skin of the wild ass, ii. 346—the skin of the shark, by great labour, polished into the substance called shagreen, vi. 223.
- Shammy*, a kind of goat, in the mountainous parts of Germany, &c.—its description—keep in flocks from four to an hundred—time of coupling—live twenty or thirty years—their flesh good to eat; the suet ten or twelve pounds—this animal has a feeble bleat, to call its young; in case of danger its hissing noise is heard at a great distance—by smell, discovers a man at half a league—feeds upon the best herbage, and delicate parts of plants, and aromatic herbs—admired for the beauty of its eyes—not found in summer, except in caverns of rocks, amidst fragments of ice, or under shades of spreading trees—in winter, it sleeps in the thicker forests, and feeds upon shrubs and buds of pine-trees, and scratches up the snow for herbage—manner of hunting it—

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dull and heavy—those with longest and finest fleeces most subject to disorders—the goat, resembling them, much their superior—they propagate together, as of one family—distinguished from deer; these annually shedding the horns, while the permanence in the former, draws an exact line between their kinds—do not appear to have been bred in early times in Britain—no country produces such sheep as England, larger fleeces, or better for cloathing—sheep without horns the best sort, and why—in its noblest state in the African desert, or the extensive plains of Siberia—in the savage state—the woolly sheep is only in Europe, and in the temperate provinces of Asia—transported into warmer countries, loses the wool and fertility, and the flesh its flavour—subsists in cold countries, but not a natural inhabitant of them—the *Iceland sheep* have four, and sometimes eight horns—its wool inferior to the common sheep—with broad tails, and weighs from twenty to thirty pounds, and sometimes supported—those called *strepficheros*, a native of the Archipelago—Guinea sheep described, iii. 32 to 45—they eat three hundred and eighty-seven plants, and reject a hundred and forty-one, 163—have eight teeth in the lower jaw—are shed and replaced at different periods—some breeds in England never change teeth, and are supposed old a year or two before the rest, 41—bring forth one or two at a time, sometimes three or four; the third lamb supposed the best—bear their young five months, 42—the intestines thirty times the length of their body, 194—in Syria and Persia, remarkable for fine gloss, length, and softness of hair, 196. See *Mouffon*.

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Shells, (fossil) found in all places near to and distant from the sea, upon the surface of the earth, on the tops of mountains, or at different depths, digging for marble, chalk, or other terrestrial matters, so

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Silks, brought to Jamaica, and there exposed to the air, rot while they preserve their colour, but kept from air retain their strength and gloss, i. 293—anciently so scarce in Rome as to be sold for their weight in gold; considered such a luxurious refinement in dress, that infamy was attached to wearing stuffs in which it made but half the composition, vii. 378.

Silk-worm, its real history unknown among the Romans to the time of Justinian; supposed only brought into Europe in the twelfth century—two methods of breeding them—Pausanias's description of this worm—changes of its skin in three weeks or a month—gummy fluid forming the threads—preparations made before spinning the web—the cone or ball of silk described—efforts to burst the cone—free from confinement, it neither flies nor eats; the male seeks the female, impregnates her in an uninterrupted union of four days, then dies upon separation, she survives till she has laid her eggs, which are hatched into worms the ensuing spring—few of these animals suffered to come to a state of maturity, and why, vii. 379 to 387—the most serviceable of all such creatures, 338.

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Skink, an animal called one of the pole-cats of America—the author thinks it Catesby's Virginia pole-cat—its description, iii. 353.

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Slatberg, in Iceland, there stood a declivity, and the earth of it was found sliding down the hill upon the subjacent plain, i. 148.

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Slotk, two different kinds of that animal, the ai and the unan—described—both seem the meanest and most ill-formed of all animals that chew the cud—their food—formed by nature to climb—they get up a tree with pain, but utterly unable to descend—drop from the branches to the ground—move with imperceptible slowness, baiting by the way—strip a tree of its verdure in less than a fortnight, afterwards devour the bark, and in a short time kill what might prove their support—every step taken, sends forth a plaintive melancholy cry, which, from some resemblance to the human voice, excites a displeasing pity—like birds, have but one vent for propagation, excrement, and urine—they continue to live some time after their nobler parts are wounded, or taken away—their note, according to Kircher, an ascending and descending hexachord, uttered only by night—their look piteous, to move compassion; accompanied with tears, that dissuade injuring so wretched a being—one fastened by its feet to a pole, suspended across two beams, remained forty days without meat, drink, or sleep—an amazing instance of strength in the feet instanced, iv. 315 to 319.

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Snail, (garden) is surprisingly fitted for the life it is to live—organs of life it possesses in common with animals; and what peculiar to itself—every snail at once male and female; and while it impregnates another, is impregnated in turn—coupling of these animals

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animals—hide their eggs in great numbers in the earth, with great solicitude and industry—the growth of them—possessed of the power of mending the shell; and come to full growth, they cannot make a new one—Swammerdam's experiment to this purpose—their food—salt destroys them; so does foot—a tortoise in a garden banishes them most effectually—continue in a torpid state during the severity of winter—so great their multiplication in some years, that gardeners imagine they burst from the earth—wet seasons favourable to their production—*sea-snail*, *fresh-water snail*, and *land-snail*—common garden-snail compared with the fresh-water snail, and sea-snail—fresh-water snails viviparous—bring forth young alive, with shells upon their backs—experiment made by Swammerdam to this purpose—at all times of the year, fresh-water snails opened, are pregnant with eggs, or with living snails, or with both together—sea-snails found viviparous, others lay eggs—manner in which the sea-snails impregnate each other—different orifices or verges of snails—the difference between land and sea-snails—of the trochus kind, have no mouth—their trunk—are among snails, as the tiger, the eagle, or the shark, among beasts, birds, and fishes—food of all sea-snails lies at the bottom—of sea-snails, that most frequently swimming upon the surface, whose shell is thinnest, and most easily pierced, is the nautilus—its description—nothing seemingly more impossible, yet is more certain, than the nautilus sometimes quitting its shell, and returning to it again—peculiarity by which the nautilus is most distinguished, vii. 18 to 35.

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- Soft-finned fishes*, their description, vi. 282 to 286.
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- Soot*, as well as salt, will destroy snails, vii. 24.
- Sore*, name the hunters give the buck the fourth year, iii. 118.
- Sorel*, the hunters name for the buck the third year, iii. 118.
- Sorrel*, wood-sorrel boiled up with milk, by the Laplanders kept in casks under-ground, to be eaten in winter, iii. 154.
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Squash, a stinkard, of the weasel kind, called a polecat of America—its description—is said to eat only the brains of poultry—its scent strong enough to reach
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reach half a mile round; near hand, almost stifling—a drop of the foetid discharge falling into the eye, might blind it for ever—dogs abate their ardour when they meet the foetid discharge, turn, and leave the squash master of the field, never to be led on again—cows and oxen strongly affected by the stench; and provisions spoiled by it—with planters and native Americans, kept tame about their houses; seldom emitting disagreeable scents, except when injured or frightened—natives eat the flesh, taking care to clear it of the offensive glands, iii. 353 to 357.

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Squirrel, a ruminating animal, iii. 5—classified as such by Pierius, iv. 3—the tails are extremely long, beautiful and bushy, and serve them for several purposes—particularly in vast leaps of one hundred yards taken from tree to tree—when the animal eats or dresses itself, it sits erect, like the hare or rabbit, making use of its fore feet as hands—the kind has as many varieties as any wild animal; enumeration of some—its way of moving is by bounds—when tamed, is apt to break away at every opportunity—few animals so tender, or so unfit for a change of abode—some live on the tops of trees, others feed on vegetables below, where also they take shelter in storms—description of its qualities, food, and mansion—the nest formed among large branches, where they fork off into small—the martin destroys the squirrel, then takes possession of its mansion, 23 to 35.

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Stag, first in rank among quadrupedes; its elegant form described—no obvious difference between the internal structure of the stag and the bull, but to a nice observer—ruminates not so easily as the cow or sheep; reason why—manner of knowing its age—differs in size and horns from a fallow-deer—increase in beauty and stature in proportion to goodness of pasture, enjoyed in security—seldom drinks in winter, and less in spring—different colours of stags—how watchfully he examines an enemy's approach—delighted with the sound of the shepherd's pipe—of animals natives of this climate, none have such a beautiful eye as the stag—beauty and size of horns mark strength and vigour—time and manner of shedding them—severe cold retards the shedding—horns increase in thickness and height from the second year of age to the eighth—shedding his horns, hides himself in solitudes and thickets, and ventures out to pasture only by night—grow differently in stags from sheep or cows—horns found to partake of the nature of the soil—a mistake that horns take colour of the sap of the tree against which they are rubbed—stag castrated when its horns are off, they never grow again; the same operation performed when they are on, they never fall off—one testicle only tied up, he loses the horn of the opposite side—Mr. Buffon thinks the growth of the horns retarded by retrenching the food—horns resembled to a vegetable substance, grafted upon the head of the stag—
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time of feeling impressions of the rut, or desire of copulation—effects the rut causes—stag lives about forty years—voice in the time of rut terrible; and then keeps dogs off intrepidly—a stag and tiger enclosed in the same area, the stag's defence so bold, the tiger was obliged to fly—the stag in rut, ventures out to sea from one island to another, and swims best when fattest, iii. 86 to 98—the hind, or female, uses all her arts to conceal her young from him, the most dangerous of her pursuers—men of every age and nation made the stag chase a favourite pursuit—stags remaining wild in England, called red-deer, found on the moors bordering Cornwall and Devonshire—manner of hunting stag and buck in England—different names given them, according to their ages—terms used by hunters pursuing the stag—the manner of knowing the track of a stag; and that of a hind—he changes his manner of feeding every month; in what manner—swims against the stream—the antient manner of pursuing him—that of hunting him—and in China—stag of Corfica—a kind called by the antients *tragelaphus*—Germans call it *bran-deer*, or *brown-deer*—a beautiful stag, thought a native of Sardinia, though perhaps of Africa, or the East-Indies—its description—*stag royal*, in Mexico—of *Canada*, brought into the state of domestic tameness, as our sheep, goats, and black cattle, iii. 99 to 114.

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Stanislaus, the exiled king of Poland, had a dwarf at his court in Luneville—described, ii. 234.

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- by swallowing shells almost of a stony hardness—float upon the surface of the sea, and in the dark send forth a shining light, resembling that of phosphorus—called *sea-nettles*—the passage for devouring food, serves to eject excrements—taken and put into spirits of wine, continue many years entire; but left to influence of air, in four-and-twenty hours melted down into a limpid offensive water—cut in pieces, every part survives the operation, becoming a perfect animal, endued with its natural rapacity, viii. 105 to 107.
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- Stars*, falling, meteors, or unctuous vapours raised from the earth, kindled and supported in the air, until they fall back extinguished, i. 363.
- Statues of antiquity*, first copied after human form, now become models of it, ii. 97.
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Stoat, the ermine, its description, iii. 327.

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Sturgeon, a cartilaginous fish, of a considerable size, yet flies terrified from the smallest fishes—its description—three kinds of it—countries of Europe this fish visits at different seasons—annually ascends the largest rivers to spawn, and propagates in vast numbers, enjoying the vicissitude of fresh and salt water, then grows to an enormous size, almost to rival the whale—the largest caught in Great Britain taken in the Elbe, where frequently found weighing four hundred and fifty pounds—places where caught in numbers—never by a bait, always in nets—their food—whence the German proverb, *He is as moderate as a sturgeon*—live in society among themselves; and Gesner has seen them shoal together at the notes of a trumpet—usual time of coming up rivers to spawn—at Pillau the shores formed into districts, and allotted to companies of fishermen, and rented some for three hundred pounds a year—nets in which caught—in the water it is one of the strongest fishes, and often breaks the nets that enclose it, but its head once raised above water, its activity ceases—has broke fishermen's legs with a blow of its tail—two methods of preparing it—that from America not so good as from

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- Suction*, from whence that amazing power in the lamprey arises, vi. 245.
- Sugar*, the white sort in the tropical climates sometimes full of maggots, i. 293.
- Sulphur*, with iron filings, kneaded together into a paste, with water, when heating, produces a flame, i. 71.
- Sun*, mock-suns and other meteors seen in the Alps, i. 134—in the polar regions, 352—reflected upon opposite clouds, appear like three or four real suns in the firmament—real sun always readily known by superior brightness—the rainbow also different in those countries, 361, 362—its warmth efficacious in bringing the animal in the egg to perfection, ii. 25—not easy to conceive how it whitens wax and linen, and darkens the human complexion, ii. 217.
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Swammerdam, lent attention to testaceous animals, almost exceeding credibility; has excelled the insects he dissected, in patience, industry, and perseverance, vii. 16.

Swan, a stately web-footed water-fowl; though an indifferent figure upon land, is beautiful in the water—doubt whether the tame kind be in a state of nature—none found in Europe—the wild swan, though strongly resembling it in colour and form, yet another

ther bird—differences between wild and tame swans—considered a high delicacy among the ancients—the tame most silent, the wild has a loud and disagreeable note—from thence called the hooper—accounts sufficient to suspend an opinion of its musical abilities—their food, nest, and number of eggs—a blow with the pinion breaks a man's leg or arm—two months hatching, and a year growing to proper size—longest in the shell of any bird—said to live three hundred years—by an act of Edward IV. the son of the king was allowed to keep a swan, and no others, unless possessed of five marks a year—punishment for taking their eggs, was imprisonment for a year and a day, and fine at the king's will—places which abound with them, vi. 101 to 108.

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Symmetry, and proportion of the human body, ii. 72.

Sympathetic, affection of yawning, ii. 83.

Synovia, a lubricating liquor in the joints, so called by anatomists, ii. 100.

Syria and Palestine, most of their cities destroyed in 1182 by an earthquake, i. 103.

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- Tamandua*, an ant-bear, larger and smaller, live upon ants—their description, iv. 310, *et seq.*
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- Tempests*, loudest formed by united contributions of minerals, vegetables, and animals, encreasing the streams of air fleeting round the globe, i. 315—frequent under the tropics, and a space beyond them—tempests of sandy deserts raised in one country, and deposited on another, 332—in Arabia and Africa described, 338.
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- Tongres*, a city in the country of Liege, formerly encompassed by the sea, and at present thirty-five leagues distant from it, i. 257.
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- Tornado*, a formidable tempest, so called by the Spaniards—its description and dreadful effects, i. 337.
- Torpedo*, its description—by an unaccountable power, the instant touched, even with a stick, when immediately taken out of the sea, it numbs the hand and arm, or whole body—the shock resembles an electrical stroke; sudden, tingling, and painful—account by Kempfer of numbness produced by it—he believes holding in the breath prevents the violence; implicit belief of efficacy would be painfully undeceived—this power not exerted upon every occasion—trials by Reaumur to this purpose—opinions concerning the cause of this strange effect—the fish dead, the power destroyed, then handled or eaten with security—the power not extended to the degree some believe, reaching the fishermen at the end of the line, or numbing fishes in the same pond—ridiculous excess of this numbing quality in the history of Abyssinia, by Godignus—Lorenzini, from experiments, is convinced the power resides in two thin muscles of the back—several fishes have acquired the name of torpedo, possessed of the same quality—Moore's and Condamine's accounts of them, vi. 237 to 242.
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